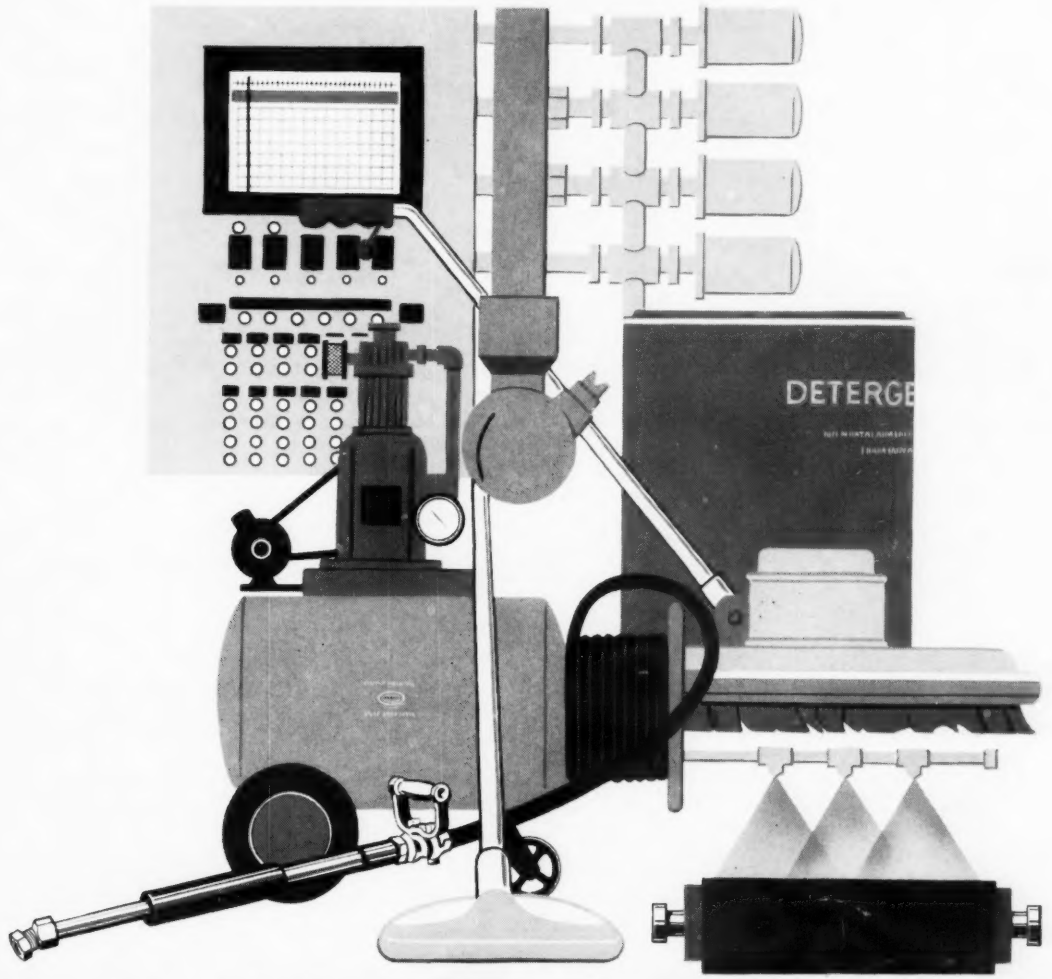
SEPTEMBER 1961

FOOD ENGINEERING

A CHILTON PUBLICATION

FOR BETTER MANAGEMENT IN MANUFACTURING



SANITATION

FE SPECIAL REPORT p. 65

The 4th "INGREDIENT"

BUILDS SALES... yet never costs a penny!

Food manufacturers satisfied with only the finest quality ingredients have for decades been using STERWIN (1) color, (2) enrichment and (3) vanillin. The result has been ice cream, baked goods, candy, beverages (and many other food products) that look better, taste better . . . *sell better!*

STERWIN's 4th "ingredient" has played a major role, too, in much of this sales success . . . and never cost a penny! For this "ingredient" is STERWIN Service . . . practical suggestions and recommendations by STERWIN's Technically Trained Representatives that frequently cut production costs while helping turn out better selling food products.

These STERWIN Representatives are highly trained, broadly experienced men who constitute a nationwide, on-the-spot task force for the more efficient production of food products. Small, medium and large food manufacturers have saved time, money, labor as a result of the sound advice and counsel offered by these sales-minded technicians.

If you use color, vanillin, enrichment . . . see your STERWIN Representative or write us direct. Learn how the 4 STERWIN ingredients can help your products look better, taste better . . . *SELL better.*

Sterwin Chemicals INC.

Subsidiary of Sterling Drug Inc.

1450 Broadway, New York 18, N.Y.

CIRCLE 2 ON INQUIRY CARD

FOOD ENGINEERING
A CHILTON PUBLICATION
FOR BETTER MANAGEMENT IN MANUFACTURING

VOL. 33 NO. 9

September, 1961

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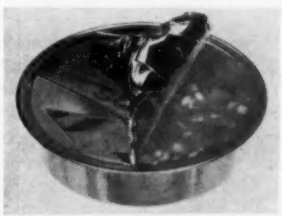

FREEZE-DRIED PACKAGING

. . . requires highly specialized containers to protect tricky products. Here's a rundown on what looks promising as a result of stepped-up R&D efforts.—p. 41.

Our big three in cartons meet everyday at Olin

The big three in cartons are the graphic designers, the structural designers and the printers. Olin has made them even more important by bringing them together under one roof. The continual interchange of ideas possible at the Olin Carton Service not only produces better cartons, it avoids any of the many mistakes that can happen when Creative is three states away from Structural, and Printing is in another time zone.

The cartons turned out by Olin's centralized (and talented) staff are made of Omnikote, the strongest board in the industry. They are printed by one of the most advanced printing establishments in the world. And they are graphically designed to do the job of flagging down the nearsighted housewife who's left her glasses home. So if you're having trouble with cartons, tell us about it. Olin's big three probably have the answer.

PACKAGING DIVISION Olin

FOREST PRODUCTS OPERATIONS, P.O. BOX 1225, WEST MONROE, LA.

FOOD Engineering

Chestnut & 56th Sts.
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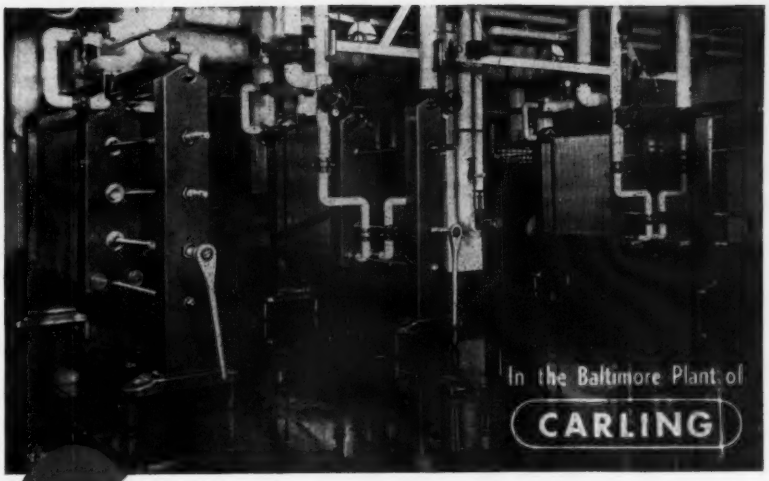


CJ Plate Heat Exchangers

COOL WORT 150°
At 5400 gal./hr. Each

In the new $16,000,000 Baltimore, Md., brewery recently placed in operation by Carling Brewing Company, Inc., three Model HM-C Chester-Jensen Plate Heat Exchangers are cooling wort from above 200° to 48° F. at an hourly throughput rate equivalent to 5400 gallons or approximately 46,000 pounds per machine per hour.

Two of the heat exchangers are connected in parallel to cool a brew of 640 barrels in about one hour and forty-five minutes. The third is operated singly as the brewing schedule may require. This machine is of heavy-duty, three-spindle type, capable of being operated at much higher capacity.

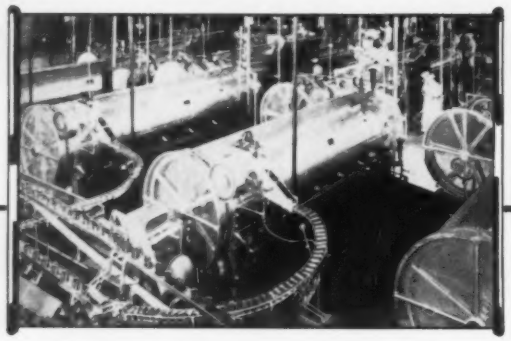
Every ounce of product of this gigantic Carling plant is passed through one or the other of these three Chester-Jensen Plate Heat Exchangers. They are installed with other equipment in the wort cooling room, which contains about 2500 square feet of floor space. The heat exchangers themselves occupy about 50 square feet of this space.

CHESTER-JENSEN COMPANY
INCORPORATED
347 Tilghman St.
(Dept. S)
CHESTER, PA.

BUILDERS OF AMERICA'S FIRST PLATE HEAT EXCHANGER

OVER 500,000 CANS PER DAY *

SCIENTIFICALLY AND AUTOMATICALLY PROCESSED TO PERFECTION... ...ARE YOURS?



* A single FMC "Sterilmatic"* Continuous Pressure Cooker and Cooler Line, for example, handles 360 No. 303 cans of brine corn per minute – sterilizing and cooking by the "in-can" method with safety and uniformity. Cans are transferred automatically to the pressure cooling shell and discharged onto the take-away conveyor at the rate of more than 500,000 cans per 24-hour peak season day.

Processors who have replaced old-fashioned batch retorts with FMC "Sterilmatic" Continuous Pressure Cooker and Cooler Lines, have practically eliminated the costly dangers of spoilage or contamination caused by incorrect retort operation, faulty equipment, improper piping, improper venting and timing procedures. With FMC "Sterilmatic," processors are virtually assured of a perfectly processed pack – every time.

WHY FMC "STERILMATIC" COULD BRIGHTEN YOUR PROFIT PICTURE

CONSTANT QUALITY – The controlled agitation process assures that products will be cooked and cooled with absolute uniformity to pre-determined quality standards.

COMPLETE STERILIZATION – "In-can" cooking method means that contents and containers are sterilized simultaneously – at temperatures up to 275° F. The high-temperature, short-time processing of FMC "Sterilmatic" Lines preserves the natural color, flavor, texture and nutrients of the product.

POSITIVE CAN HANDLING – Cans are positively controlled throughout. Can denting, a common problem in retort operations, is practically eliminated.

FASTER PROCESSING – Induced convection heating through agitation increases the rate of heat penetration, resulting in substantial reductions of over-all processing time. Conversely, the same principle applies in the cooling process.

LOWER OPERATING COSTS – The "One-Man Cook Room" is a reality with FMC "Sterilmatic" Lines. The absence of repeated venting procedures saves up to 50% in steam. Controlled counterflow cooling of cans keeps water consumption to a minimum.

For more than 35 years, FMC "Sterilmatic" Continuous Pressure Cooker and Cooler Lines have been serving the food processing industry, providing faster, safer processing and money-saving benefits for satisfied users. FMC is ready to give you – without obligation on your part – proven facts, figures and plans that could lead you to greater profit possibilities. Why not contact us today?

Dedicated to serving the food industries through better equipment for better food products

*Trade Mark—Reg. U.S. Pat. Off.

FMC CORPORATION
CANNING MACHINERY DIVISION

General Sales Offices:
WESTERN: SAN JOSE, CALIF. · EASTERN: HOOPESTON, ILL.

TRENDS & FORECASTS

General business advanced through 2nd quarter, Commerce Dept. reports. June showed important gains in employment, income, and industrial production. GNP hit record $515 billion rate.

Personal income in June reached $416.5 billion rate. This is $13.5 billion above February low and $10 billion over October peak.

U. S. food manufacturers will spend $142 million abroad in '61 for new plant and equipment, up 46% over '60 says Commerce Dept.

Cost of food rose 15% in decade as take-home pay jumped 59%.

Number of babies born in U. S. in '60 is estimated at 4.3 million, same as in '59 and 40,000 more than in '58, HEW reports.

U. S. Agricultural exports hit $4.9 billion high in '60-61, according to USDA. This is 8% higher than year earlier.

Total crop this year is expected to be 7% below '60 record. Grain program produced acreage cuts.

Production of six processing vegetables will be 10% higher than in '60, or 7.2 million tons, says USDA. Snap beans will be up 13%; kraut cabbage, 7%; sweet corn, 24%; green peas, tomatoes, 6%.

Frozen food distributor sales were $846 million in 58, up 85% over '54, Commerce Dept. reports. There were 1,128 establishments.

Total canned fruit pack is 2% under all-time high of '60, according to California Packing. Total supply is near record.

Distributors' stocks of 8 of 12 canned vetetables surveyed are higher than year ago, says Commerce Dept. Lima beans, carrots, sauerkraut, and five tomato items are up—catsup and chili sauce by 19%.

Beet sugar output will be record 2.8 million tons, U. S. Beet Sugar Assn. forecasts. May exceed quota by 250,000 tons.

Russia's sugar beet crop may exceed 7.5 million metric ton record by Cuba in '52 says Dyer. Soviet will take 3 million tons from Cuba, divert 0.5 million to China, leaving surplus.

Of electrified homes, 23.4% have food freezers, 98% refrigerators.

Poultry is 18% of all meat, fish, and poultry eaten in U. S., compared to 11% in '40, USDA reports. Continued increase is seen.

See Developments to Watch p. 15

Oakite Makes the

1. Dried blood on meat trolleys. Soak in hot solution of Oakite Rustripper. Rust, blood, grease fairly melt away. Send for Bulletin F-7894.

2. Edible oil equipment. Remove spillage with an Oakite Hurriclean Steam-Detergent Gun charged with Oakite 24. Use steam gun to rinse. Send for Service Bulletin 10A.

Easy answers to 8 of the toughest cleaning jobs in the business

These eight cleaning jobs are among the toughest in the food industry. That's straight from the men who know—those responsible for getting the job done.

Other tough soils succumb to the right material applied the right way. The answer to any cleaning situation comes from a list of more than 180 job-matched Oakite cleaning and related materials. An accurate recommendation takes an on-the-spot analysis by a nearby Oakite Technical Service Representative . . . just one of the Big Plus factors you get with specialized Oakite materials.

Call him in. He'll help you pick the material for solving your toughest cleaning chores—or develop a complete Coordinated Cleaning Program that suggests materials, methods and schedules for the most effective sanitation *plant-wide*, at the lowest overall cost. Organized to match your problems, processes and equipment, it's a program that will make your toughest cleaning jobs easier—your routine jobs faster. Meanwhile, send for the appropriate bulletins listed under the photographs. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

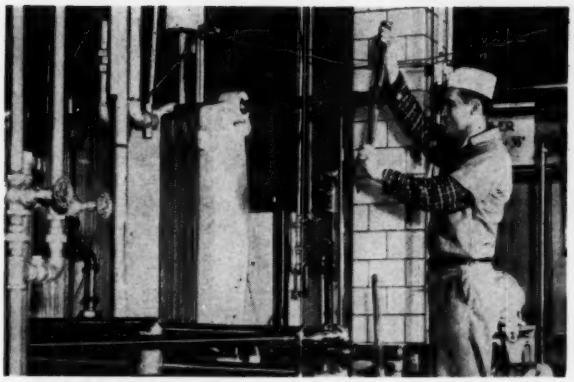
OAKITE

SCIENCE

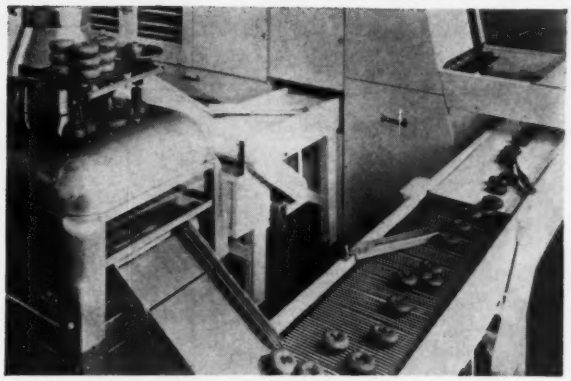
over 50 *Est. 1909*

years' leadership in industrial cleaning

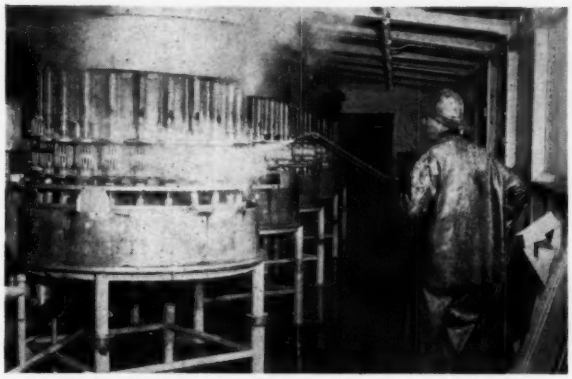
Tough Jobs Easy



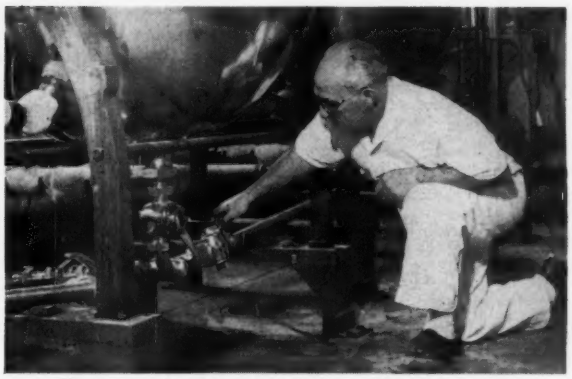
3. Pasteurizers. Prepare and circulate hot solution of Oakite 162 in sequence with Oakite 31. Contaminants quickly removed. Top efficiency restored to your pasteurizers in no time at all. Send for Service Bulletin 34A.



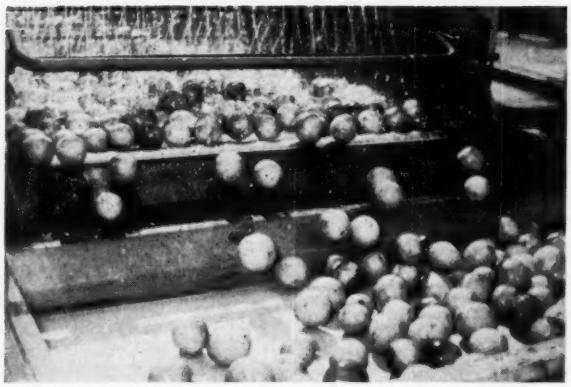
4. Deep fat fryers. Fill Oakite Hot-Spray Unit with solution of Oakite 62. Spray inside of oil reserve tank, fryer interior and exterior. Rinse. No more off-taste danger. Send for Service Bulletin 27A.



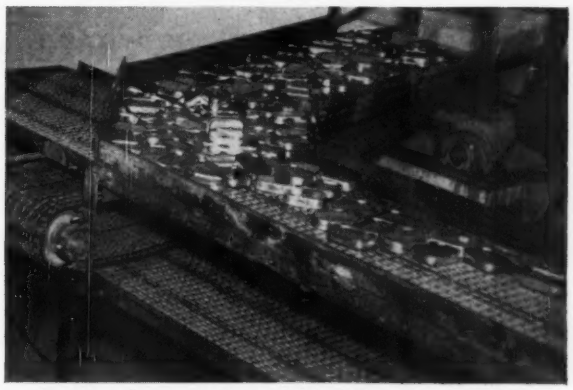
5. Carbonized juices, fruit and vegetable. Circulate hot solution of Oakite 190 through lines, closed equipment. Rinse. Spray equipment exteriors with same solution. Job's spotless inside and out. Send for Bulletin F-9414.



6. Heavy syrup in copper candy kettles. Fill kettle with solution of Oakite 20. Boil. Rinse. Fill with hot, copper-brightening solution of Oakite 84-M. Scrub, rinse, neutralize. Copper gleams again. Send for Bulletin F-9086.

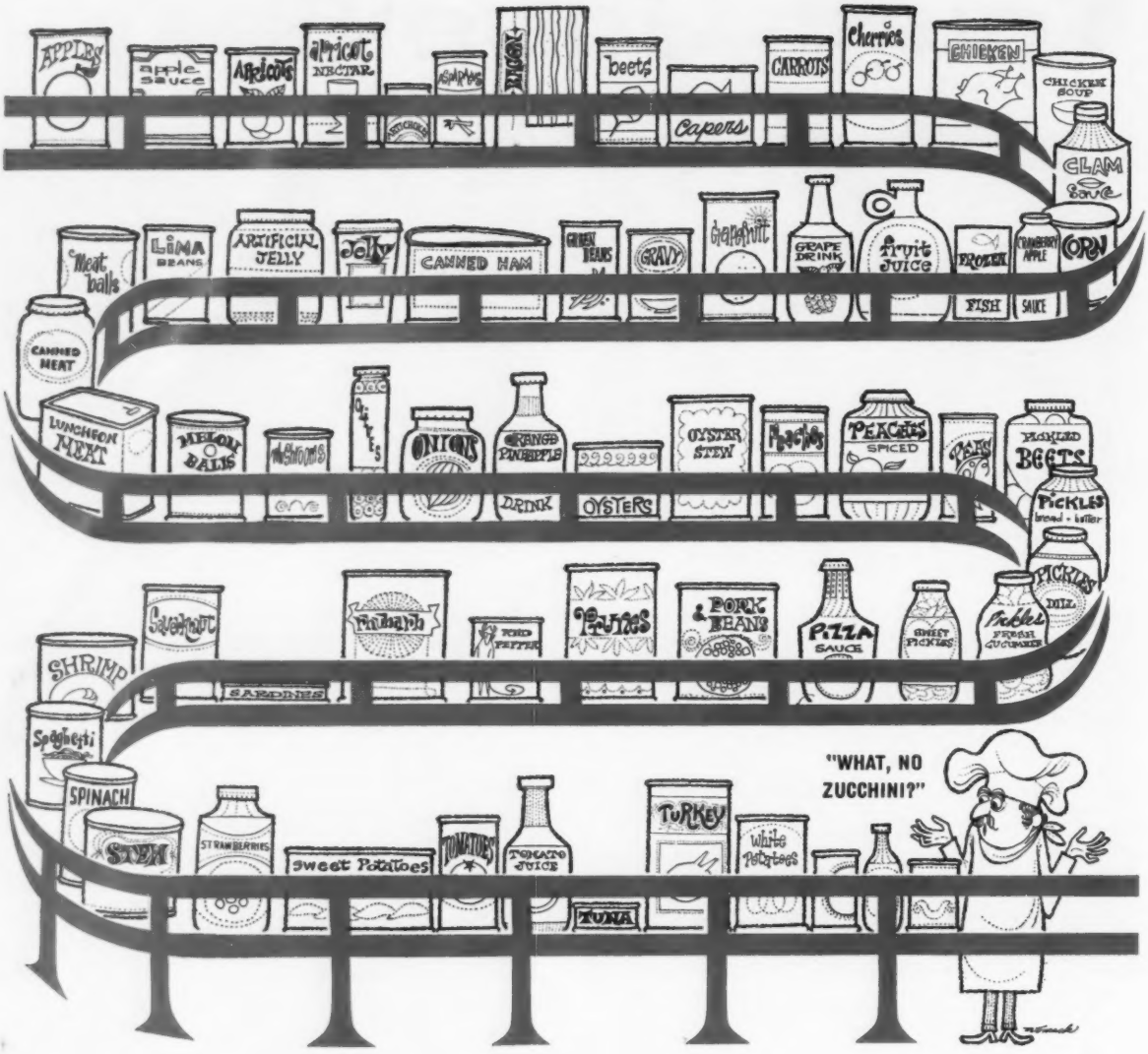


7. Citrus stains on stainless steel equipment. Spray or circulate hot solution of Oakite 162. Same solution is also excellent for copper equipment. Your surfaces will shine. Send for Bulletin F-9414.

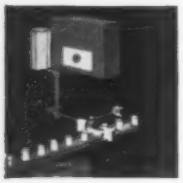


8. Rust, scale. Run solution of Oakite 32 through water circulating equipment. Spray solution of Oakite Rustripper on exteriors. Scale, rust, grease and dirt disappear. Send for Service Bulletin 98A.

The big PLUS SERVICE EXPERIENCE RESEARCH PERFORMANCE in Oakite



NEW MORTON FLOCRON DISPENSER CUTS CANNING COSTS FOR 63 PRODUCTS!



No splash . . . no spill . . . no overfill! Companies who use Morton's amazing Flocron liquid dispenser system to handle any of the 63 different food products listed above report that Flocron avoids the waste inherent in "overflow fill" systems, stops splash loss, and dispenses more than 40 different ingredients with money-saving speed and accuracy.

The versatile Flocron is actually a precise electronic system with photoelectric circuits in a sealed unit and a new lever-type photo switch to activate dispensing. It assures accuracy, even on lines handling up to 300 units per minute! Remote electronic controls permit you to "dial" the exact amount of liquid required for varying can sizes.

Designed for efficient, low cost operation. The Flocron is made of stainless steel and plastic and is constructed to avoid corrosion and lengthy breakdowns that result in costly downtime. There are no valves to stick or clog, and the Flocron is easily cleaned by circulating a detergent solution through the fluid system and following this with a sanitizer. No need to revise production lines. The Flocron can be operated with existing equipment. Scientific Dispensing Company technicians in all areas will assist with installation and servicing.

Some of the liquids you can dispense with the Flocron are: ascorbic acid, beef gravy, brine, concentrated syrup, hot butter, Monosodium Glutamate, spice oils, sugar and brine, tomato puree and vinegar.

MORTON ALSO OFFERS CORROSION-FREE BRINEMAKERS

In addition to the Flocron liquid dispenser, Morton also offers a complete range of Brinemakers, capable of producing up to 800 gals. of saturated pure brine per hour. With the Morton Brinemaker, salt is handled only once at the Brinemaker location from where it may flow or be pumped to the Flocron or other usage points. No space-wasting storage tank needed; no need for costly shut downs for cleaning out impurities.

SCIENTIFIC DISPENSING COMPANY / DIVISION OF

MORTON SALT COMPANY

110 N. Wacker Drive • Chicago, Illinois • FI 6-1300

Schedule of Events

September

11-13—Second Biennial Symposium on Foods, Oregon State Univ., Corvallis, Ore.
19-27—Internat'l Conference on Fish and Nutrition, Washington, D. C.
23-28—Master Brewers Assn. of America, meeting, Hotel Queen Elizabeth, Montreal, Canada.
25-28—Industrial Bldg. Exposition & Congress, New York Coliseum, NYC.
25-28—Sanitation Maintenance Show, Hotel Sheraton, Philadelphia.

October

1-4—Produce Packaging Assn., meeting, Chase-Park Plaza Hotel, St. Louis, Mo.
7-12—Baking Industry Exposition, Convention Hall, Atlantic City, N. J.
9-10—Nat'l Pickle Packers Assn., meeting, Drake Hotel, Chicago.
15-17—Brewers' Assn. of America, meeting, Edgewater Beach Hotel, Chicago.
18-20—Packaging Institute, Annual Nat'l Forum, Biltmore Hotel, NYC.
19-20—American Society for Quality Control, meeting, Chase-Park Plaza Hotel, St. Louis, Mo.
22-27—Milk Industry Foundation & Internat'l Assn. of Ice Cream Mfrs., meeting, Washington, D. C.
28-N1—Nat'l Automatic Merchandising Assn., Internat'l Symposium, McCormick Place & Conrad Hilton Hotel, Chicago.
31-N1—Packaging Assn. of Canada, meeting, Automotive Bldg., Exhibition Park, Toronto, Canada.

HORS D'OEUVRES

▸ **Labor required per unit of production on American farms is about half to one fourth as much as on Russian state farms. All that and democracy too!**

▸ Sales of fish are impeded by unfortunate names, in the opinion of President Vicary of Trademark Management Institute. Consider these: Smelt, Weakfish, Croaker.—You know, he's right!

▸ **It is a basic premise of the German food regulations that even if foods containing additives are harmless they are not necessarily suitable for human consumption. Young housefraus will teach 'em that convenience foods with additives are suitable and necessary.**

▸ Fat children grow faster and mature earlier than the thin ones, recent research shows. But excess body fat is not to be desired at any age, according to Nutrition Foundation. So Skinny wins again.

▸ **Our national anthem was modeled by Francis Scott Key upon the old English drinking song "To Anacreon in Heaven." There's a familiar ring to these last two lines: "And long may the sons of Anacreon twine The myrtle of Venus with Bacchus's vine." —Wine, women, song, and freedom!**

▸ Mickey Mantle can't claim in advertisements that he drinks a particular brand of milk when such is not the fact. So ruled FTC when it caught Mickey off base.

For Your Studies in

Food Freeze-Drying

RePP Sublimators — accepted by the pharmaceutical industries for the preservation of vaccines, enzymes and a host of other drug products requiring the highest quality freeze-drying — are now specifically designed for food freeze-drying research. The Sublimator principle incorporates fin-condensing coils right in the product chamber. Results — important savings in original equipment costs plus increased drying efficiency through short path molecular distillation.

For food freeze-drying investigations Sublimators are equipped with radiant heating plates. Maximum sublimation rates are easily obtained — information which directly transfers to large scale equipment commercially available today.

Features

- Short Path Molecular Distillation
- Radiant Heating Plates
- Automatic Operation
- Complete Product Visibility
- No Plumbing Connections Required
- Operates From a Single Electrical Connection
- Fully Mobile

Sublimators are available in three capacities — the 15, 40, and 100. Tray areas range from 4.5 sq. ft. for the model 15 to over 30 sq. ft. for the model 100. Sublimators are complete, automatic instruments with product heating supplied by radiant heating plates, contact plates, or combination contact-radiant heating plates. Standard controls are conveniently located in the front panel. Recording equipment is flush mounted at the side of the cabinet.

For full details on the *economical* Sublimator automatic freeze-drying system write:

RePP Industries, Inc. Gardiner, New York

CIRCLE 11 ON INQUIRY CARD

pick a plant...

TRENTON, N.J.
BENTON HARBOR, MICH.
LAKELAND, FLA.
CLEVELAND, OHIO
SPARTANBURG, S.C.
JAMESTOWN, N.C.
EATON RAPIDS, MICH.
WASHINGTON, PA.

Union-Camp now offers you 14 corrugated box plants

Fast service is no gamble when you deal with Union-Camp. Fourteen corrugated box plants are strategically located to supply all your corrugated packaging needs. Customized local service is combined with a comprehensive packaging evaluation program designed to assist you in specifications analysis, structural design, box testing, materials handling and graphic design.

Important reasons why more and more companies are turning to Union-Camp for creative help in packaging.

UNION-CAMP®

CORRUGATED BOXES

Union Bag-Camp Paper Corporation · 233 Broadway N.Y. 7, N.Y.

Plants:

*Dedham, Mass.; Allied Container Corp., Route 128, Allied Drive
Trenton, New Jersey; 1400 E. State St.
†Washington, Penna.; P. O. Box 285
†Cleveland, Ohio; 10200 Miles Ave.
†Sharonville, Ohio; P. O. Box 86
Chicago, Ill.; 4545 West Palmer
†Benton Harbor, Mich.; 11th St. & Britain Ave.
†Monroe, Mich.; 1109 East Elm Ave.
†Eaton Rapids, Mich.; P. O. Box 8
*Baltimore, Md.; Eastern Box Co.; Wagner's Point
Jamestown, N. C.; 3704 Point Pleasant Rd.
Spartanburg, S. C.; P. O. Box 1965
Savannah, Georgia; P. O. Box 570
Lakeland, Florida; P. O. Box 454

*Subsidiary Companies †River Raisin Division

ROCHE Beta CAROTENE

1961 DATA SHEET

SAFE AS A COLOR, SAFE AS A NUTRIENT FOR OIL AND WATER-BASE FOODS

MARGARINE · SHORTENING · BAKED GOODS · SALAD OILS · COOKING OILS · MELLORINE
FROZEN FOODS · FRUIT DRINKS · FRUIT JUICES · FRUIT CONCENTRATES · PUDDINGS
GELATIN · DESSERTS · EGG YOLK PRODUCTS · CANDIES · DESSERT TOPPINGS · SOUPS
CHEESE · POPCORN · CREAMED FOODS · PIE CRUST MIXES · CAKE MIXES · ICE CREAM PRODUCTS

TRUE COLOR. Roche Beta CAROTENE gives foods a true, natural-looking orange to yellow color (depending on the amount used) without any tinge of green. No change to a reddish color happens during storage, as may occur with some vegetable pigments or impure concentrates.

NUTRITIVE VALUE. Roche Beta CAROTENE is a provitamin A. It is converted within the human body to vitamin A.

STABILITY. Excellent stability has been demonstrated by extensive laboratory tests and years of reliable performance in commercial use.

Roche produces various types of beta carotene in vegetable oils, emulsions, aqueous dispersions, and in spray-dried beadlet form. The basis for all of these is crystalline Beta CAROTENE Roche — the pure all trans-form which has 1,666,667 U.S.P. units of vitamin A activity per gram. Roche Beta CAROTENE is not a mixture of isomers of varying color values, nor does it contain off-flavor constituents. The particular type that is best suited for coloring your product depends on various factors, such as your equipment and process. The Roche Technical Staff can recommend the form (or combination of forms) that will provide the results that you want in your product.

TYPES FOR GENERAL USES

30% Beta CAROTENE in vegetable oil — 500,000 U.S.P. units of vitamin A activity per gram. Each gram contains 0.30 gram of Beta CAROTENE.

24% Beta CAROTENE, Semi-Solid Suspension in vegetable oil—400,000 U.S.P. units of vitamin A activity per gram. Each gram contains 0.24 gram of Beta CAROTENE.

These provide a broad approach to a wide range of coloring problems in both oil and water base food products.

They may, for example, be combined with or diluted in certain of the raw or semi-finished materials used in processing your own food products.

TYPES FOR SPECIFIC USES

22% Beta CAROTENE HS in vegetable oil. Specifically developed to meet the needs of the popcorn industry for a heat stable coloring material.

Beta CAROTENE Emulsion, Beverage Type 3.6. Water dispersible. Provides orange color to beverages and foods; and 60,000 U.S.P. units vitamin A activity per gram.

Dry Beta CAROTENE Beadlets Type 2.4-S. Water dispersible, free flowing beadlets. Provides light-to-dark orange color to water-base foods. (In fruit drinks, it produces a clouded effect similar to that produced by fruit insolubles.) Each gram provides 40,000 U.S.P. units of vitamin A activity; thus permitting a label claim.

CUSTOM PACKINGS

Batch size sealed, sanitary cans carrying labels showing your name and formula.

Beta CAROTENE Blends — Dilutions of Beta CAROTENE Roche are made in vegetable oil. Minimum dilution, 6%, which is equivalent to 100,000 U.S.P. units of vitamin A activity or 0.06 gram of Beta CAROTENE per gram of blend.

Beta CAROTENE and Vitamin A Blends — Roche Beta CAROTENE and Roche Vitamin A (acetate or palmitate) are blended in vegetable oil according to your specifications. A range of potencies is available, including high-potency blends with no oil dilution. These are economical to use.

When you need a safe, pure yellow-to-orange color (the color with a nutritional bonus), come to Roche. Our technical staff will gladly study your needs and make recommendations. We have a type for your need. No obligation, of course.

BETA CAROTENE, THE COLOR THAT NOURISHES COMES RIGHT FROM ROCHE

Fine Chemicals Division
NOrth 7-5000

HOFFMANN-LA ROCHE INC.

Nutley 10, New Jersey
New York: OXford 5-1400

ROCHE®

DEVELOPMENTS TO WATCH

Campbell has introduced a line of seven dry soup mixes in aluminum cans with pull-tab opener, two cans in paperboard carton.

Several ingredients are freeze-dried by Campbell, in new multi-million dollar soup plant at Camden, N. J. New packaging facilities and special processes are in dehumidified plant areas.

New twin-pack of frozen chicken livers has one-piece top and sides that tear in two along perforated lines. Palace Products uses it.

Hamburgers which do not shrink when cooked are Armour innovation. Patented techniques control temperature and fat content.

Cholesterol level depends less upon kinds of food eaten and more upon certain other factors, such as functions of liver. So claims Russian cardiovascular expert Kurashov. He reports normal Hungarian cholesterol level despite high lard diet.

National Biscuit will make 30-cal. survival ration cracker available to defense agencies. Price, $35 per lb. Minimum order, 10,000 lb.

New high-quality strawberry suited to freezing and resistant to disease is announced by USDA and Oregon Ag. Experiment Station. Called "Molalla," it will be available to growers next spring.

Cereal flakes and flour will be made from bananas in new dehydrating plant of Jamaica (East Indies) Industrial Development Corp.

Safflower margarine oil will be produced and marketed by Durkee under agreement with Pacific Vegetable Oil, pioneer producer. Ingredient is highly poly-unsaturated oil. (FE, May, p. 86)

Conventional processes effect little or no change in protein quality, according to American Meat Institute Foundation.

See Who's Building What p. 17

Lean to fat ratio in meat is determined in seconds by x-ray device used in sausage making by Morrell. It is an Anyl-Ray Corp. unit.

Washington Report p. 19

Post-irradiation injections of olive oil about double survival rate of mice exposed to mid-lethal x-ray doses, AEC reports. Peanut oil, triolein, and methyl oleate provide similar protection. Oil facilitates recovery, does not reverse radiation damage.

Through Federal support, advanced program in teaching nutrition will be established at University of Michigan.

Mayfair Markets newest store unit, Anaheim, California

"STYROFOAM®—

installed by a Dow Approved Insulation Contractor—pays big dividends!"

"Since we were introduced to Styrofoam insulation a number of years ago, it has become our policy to use only this material for the insulation of our coolers and freezers," says Bob Bernstein, Director of Store Planning for the Mayfair Markets.

"We've found that the letter-perfect installation of Styrofoam by a Dow Approved Insulation Contractor pays dividends in performance over the years.

"Our current plans call for a continued growth of new markets in selected areas of the Western states. In our rapid growth of expansion, we cannot afford mistakes and must depend upon reliability of products used with minimum of maintenance cost.

"Our selection of Styrofoam and the Approved Insulation Contractor Program is our insurance against future costs, which pays dividends in performance over the years."

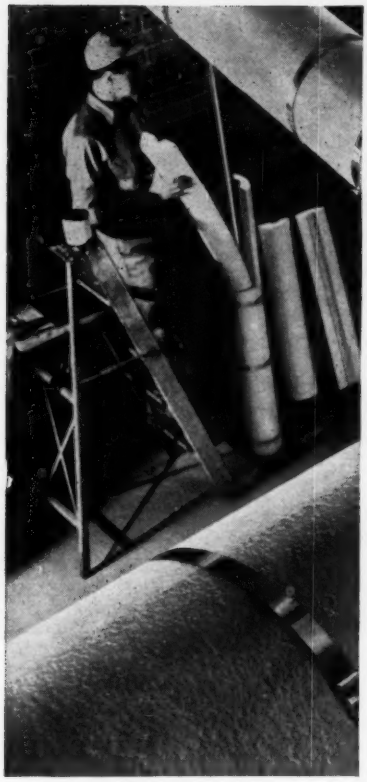
Mr. Robert D. Bernstein, Director of Store Planning for Mayfair Markets.

Low-cost Styrofoam rigid insulation board contains millions of tiny non-interconnecting air cells. This cellular structure gives Styrofoam a permanent low "K" factor. Further, Styrofoam won't rot, has no food value to attract insects or vermin, and it's so easy to handle that the time and cost of installation are cut to a minimum.

The seal above is displayed by all Dow Approved Insulation Contractors. They are selected by Dow for their excellent business reputation and high quality workmanship. They carefully follow Dow recommendations for installing Styrofoam. For the name of Approved Insulation Contractor near you, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 1540KE9.

Styrofoam is a registered trademark of The Dow Chemical Company. It is applied only to the homogeneous expanded polystyrene made according to an exclusive Dow process. Styrofoam brand insulation board is available only from Dow and its authorized representatives.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan



Stops moisture...

STYROFOAM®

for pipe covering insulation

Low-temperature pipe covering made of Styrofoam does an excellent job and requires minimum maintenance. Its unyielding resistance to moisture and its permanent low thermal conductivity prevent condensation and dripping—reduce heat transfer.

Pipe covering made of Styrofoam will not crack or split from thermal shock. Since it does not absorb water, it is not affected by ice build-up around uninsulated valves. It's lightweight and easy to apply. A complete line of pipe and vessel covering made from Styrofoam is available from the following fabricators:

COLUMBIA ASBESTOS CO., Portland, Ore. • ENGINEERED FOAM PLASTICS CORP., Elkhart, Indiana • GLO-BRITE PRODUCTS INC., Chicago, Illinois • KENNEDY INDUSTRIES, Los Angeles, California • KRANSCO MANUFACTURING COMPANY, South San Francisco, California • MMM INCORPORATED, Houston, Texas • ROBINSON INDUSTRIES, Coleman, Michigan • STYRO FABRICATORS, Kansas City, Kansas • STYROFORMICS, INC., Somerville, Mass. • STYROPLASTICS, INCORPORATED, Minneapolis, Minnesota • TUFFLITE PLASTICS, INC., Ballston Spa, New York

DOW

Who's Building What

Monthly Reports: These food firms will spend $14,484,483 for expansion.

Contracts Awarded

Anderson Clayton & Co., Sherman, Tex., food processing plant addn., $246,000.

Borden Dairy Co. Ltd., Toronto, Ont., milk plant & offices, $1,200,000.

Burke Farmers Dairies Inc., Morgantown, N. C., dairy processing plant, $220,000.

Coca-Cola Bottling Co., Lubbock, Tex., bottling plant, $112,600.

Delchamps Inc., Mobile, Ala., frozen food storage plant, $500,000.

Dr. Pepper Bottling Co., Blytheville, Ark., bottling plant, $110,000.

Fergus Falls Dairy, Fergus Falls, Minn., dairy addn., $131,000.

Fischer Packing Co., Louisville, Ky., packing plant addn., $1,500,000.

Lubbock Packing Co., Lubbock, Tex., meat & products packing plant, $775,000.

Narragansett Brewing Co., Cranston, R. I., warehouse addn., $339,790.

National Tea Co., New Orleans, La., warehouse, office, & service bldgs., $2,757,000.

Palmetto Grape Marketing Assn., Spartanburg, S. C., grape processing plant, $125,000.

Pan American Foods Inc., Brownsville, Tex., food plant expansion, $150,000.

Paul Masson Winery, Saratoga, Calif., warehouse addn., $225,000.

Safeway Stores Inc., Landover, Md., milk plant, $893,093.

True Taste Corp., Edcouch, Tex., citrus processing plant, $200,000.

Virginia Trout Co., Monterey, Va., fish hatchery & preparation plant, $125,000.

Proposed Projects

Carolina Dairy, Greenville, N. C., ice cream mfg. plant, $150,000.

Coca-Cola Co. Ltd., Ottawa, Ont., plant, $1,000,000.

Collins Street Bakery, Corsicana, Tex., bakery, $325,000.

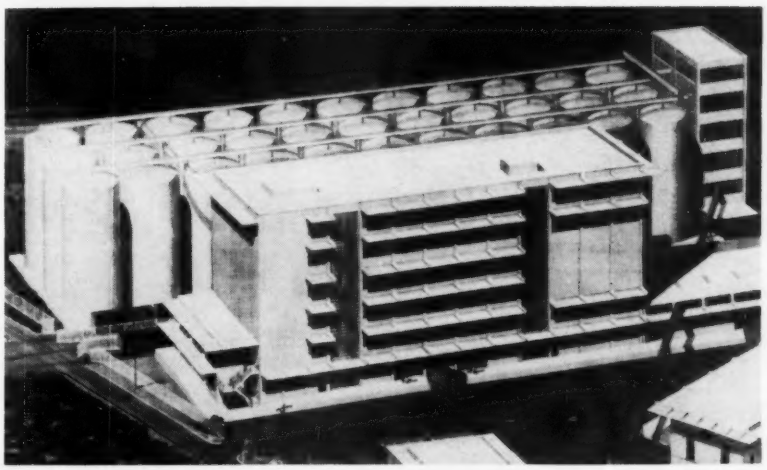
Cott Beverage Co., New Haven, Conn., plant, $1,500,000.

National Dairy Products Corp. (Kraft Foods Div.), Miami, Fla., distribution warehouse & office, $250,000.

National Dairy Products Corp. (Sealtest Foods Div.), Roanoke, Va., dairy processing plant, $1,250,000.

Owens Country Sausage Co., Richardson, Tex., sausage plant, $250,000.

South Texas Producers Assn., Jacksonville, Tex., ice cream mfg. plant, $150,000.



NIGERIA'S FIRST FLOUR MILL is expected to near completion next spring. Architect's sketch shows major structures—office bldg. (foreground), flour mill and warehouse (center), and bulk wheat silos (background). Allis-Chalmers will provide all process equipment.

ANHEUSER-BUSCH, INC.

ANHEUSER-BUSCH, INC.

Sign of highest quality

FOR THE CONFECTIONERY INDUSTRY

CORN SYRUPS
THIN BOILING STARCHES
MOULDING STARCHES

all fine products...

from the corn we took <u>off</u>
the cob

ANHEUSER-BUSCH, INC.
Bulk Corn Products Division
St. Louis, Missouri

CIRCLE 18 ON INQUIRY CARD

Washington Report

Feedback snafu? . . . Drive on slack fills gains . . . FTC mail order probe challenged

Breakdown in Communications?

Who does FDA talk to when it uncovers short weighted packages? Do regional managers feed FDA warnings back to headquarters?

These two questions are raised by circumstances surrounding seizures of Quaker Oats puffed goods (FE Aug. '61, p. 17). In its original press release, **FDA said QO "was aware of the short weight problem as early as April"** but that "it continued distribution" of the defective units until the government acted in July.

Queried about this 3-mos. "time lag," a QO spokesman told FOOD ENGINEERING: **"There was no contact between FDA and the Company on this subject until mid-July,** at which time we took immediate corrective action." He suggested that FDA may have had the "impression" that QO's production people were aware of the problem in April. Cereals maker has launched a broad investigation to find out just what went wrong.

Berries Draw Look-see

Tariff Commission is keeping a close watch on rising volume of frozen strawberry imports. But, a spokesman says, "we have no plans for a formal investigation on our own."

U. S. freezers, weighing the idea of making a formal request for a probe next year, have begun gathering necessary data. If Mexican imports in '62 continue to show a growth pattern, domestic producers will probably launch a formal campaign for stiffer quotas or higher tariffs.

Meanwhile, Administration began its own homework for next year's reciprocal trade battle. Census Bureau sent questionnaires to 20,000 plants for data on portion of output exported in '60.

Closer Coffee Check

Driving for cleaner coffee imports, FDA port inspectors are rejecting shipments that formerly slipped through. It's not a cocoa bean type crackdown (where mold and insect tolerances were trimmed), but simply stepped up inspection with these standards tightly applied:

Is coffee contaminated by other cargo? Insect infestation? Water damage? Are coffee sweeps being sold at higher grades?

FDA's Sleuths Bear Down Hard

As forecast here (FE June '61 p. 21), FDA's seizures of food packages are rolling into high gear. Between July 10 and Aug. 10, agency picked up 99 food lots for alleged short weights and slack fills. Behind the step-up is FDA's view that a new "get tough" campaign is needed against deceptive packaging. Also, agency feels that plant managers, pressured by home office to prune costs, are trying extra hard to cut overweights and, as a result, are letting more short weights go through.

Up to now, when agency found short weights, it took additional samples to see if a corresponding number of over weights existed. If the latter offset the former, prosecution rarely resulted. Today, however, enforcement pattern is being tightened.

Reminder: FDA's tough enforcement is here to stay. So check your packaging controls.

Armour, FTC Hassle Shapes Up

Federal Trade Commission's wide-ranging food probe got its first court challenge when Armour refused to file a Section 6 report on promotion allowances. Commission's first reaction was to give the meat packer more time—until Oct 16—to comply. If company still refuses, FTC will likely go to court since it rates Section 6 as one of its heaviest artillery pieces.

Fallout and You

With cold war heating up, it may be a good time to review the report, "Vulnerability of the Food Industries to Chemical, Biological, and Radiological Warfare," issued by Civil Defense Foods Advisory Committee in '55. Office of Civil & Defense Mobilization has reprints available. OCDM's advice: Keep duplicates of formulae, process notes, company records, and sales data.

BRIEFS

USDA plans to restore old moisture standards which require that smoked hams at retail can't weigh more than uncured weight. Effective date: Oct. 1.

Possible trade practice rules for baking field, sought by midwestern bakers, collapsed when firms in other areas declined to go along.

New minimum wage law will increase industry's payroll by only .4%, Labor Dept. estimates.

Plans for a "consumer office" at White House or Cabinet levels have been scrapped and job given to agencies such as FTC and FDA.

(Turn page)

GENISCO TRANSISTORIZED CONVEYOR CONTROLS

Get the most in efficiency and reliability from your conveyor system with these new Genisco Electronic Conveyor Controls. Utilizing the electronic industry's most advanced transistor circuitry and modular construction, Genisco Model OC1100A Electronic Conveyor Controls reduce maintenance costs and provide higher speeds for greater productivity. Genisco solid state electronics eliminate many of the potential trouble points of mechanical controls. Add savings in time and operating costs to your product handling with Genisco Electronic Conveyor Controls.

- **Completely transistorized**
- **Cast aluminum housing with moisture proof seal**
- **No warmup, instant start**
- **Adjustable, stop and start time delays**
- **Modular construction for quick checkout, easy maintenance**
- **Sensing head - control box connecting cable up to 1000 ft. long.**

OPTICAL SENSING HEAD

Completely moisture sealed . . . Long life source lamp . . . Pre-aligned light beam for precision control . . . Rugged all-aluminum construction, stainless steel hardware.

Genisco INCORPORATED

2233 Federal Ave., Los Angeles 64, California

Washington Report *(Continued)*

Revised USDA Standards:

Table Grapes are slated for revision with increased tolerance for undersize bunches to 25% for fruit packed in consumer size packages of 5 lbs. or less. Proposed by USDA.

Frozen Fried Breaded Scallops are under revision consideration as to description of product, styles of pack, grades, and factors of quality. Proposed by Bureau of Commercial Fisheries.

Filberts In The Shell have been proposed for revision with a lowering of minimum size of "large" classification of round-type nuts by 1/64th of an inch, from 50/64ths to 49/64ths. Proposed by USDA.

Fresh Mushrooms are under consideration for revision for first time. Consumer standards would establish two grades—"A" and "B" and would serve as consumer buying guide for quality distinction. Proposed by USDA.

FDA Standards of Identity:

Enriched Corn Meal standards may be amended to contain in each lb. not less than 500 mg. and not more than 750 mg. of calcium, provided that enriched self-rising corn meals contain in each pound not more than 1,750 mg. of calcium. Proposed by American Corn Millers' Federation.

Potatoes treated with MH-30 to prevent sprouting do not require special "sprout-treatment" labeling now required by FDA according to U. S. Rubber Co.'s Naugatuck Chemical Div. FDA regulations do not apply to this product because it is sprayed on potatoes before harvesting.

Experimental Food Packs with temporary permits for interstate shipment, varying from legal requirements, shall be published in the Federal Register according to FDA's recent decision. This applies to either granting or revocation of such permits.

Frozen Desserts for special dietary use may contain up to 5 grams of sorbitol in the average serving according to proposal now under consideration by FDA. Anything over 5 grams/serving must be labeled as such, including a statement of what constitutes an average serving, such as ¼ pint, 1/3 pint, etc. Proposal filed by Germantown Mfg. Co., Philadelphia.

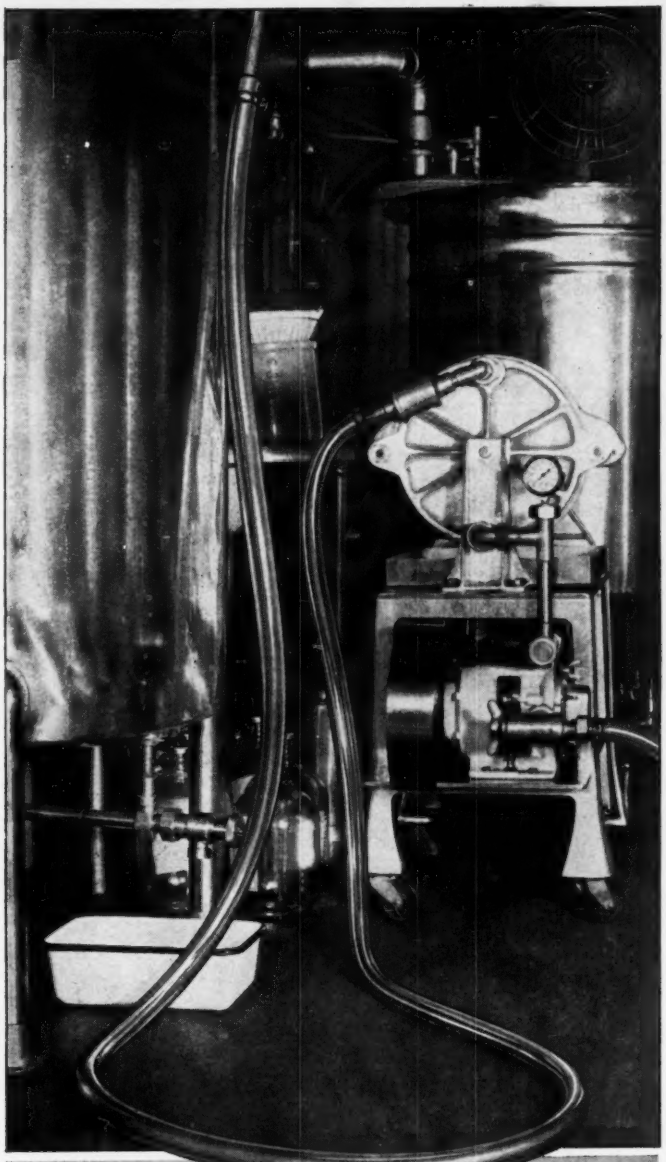
FE's Box Score on Key Legislation

BILL	SPONSOR	OBJECTIVE	COMMITTEE
HR 4363	Willis	Set up Congressional study of taxes imposed on interstate commerce by states, territories, and possessions.	Judiciary
HR 8307 HR 8314 HR 8318	Harvey Roudebush Teague	Bar subsidized export, for sale by CCC, of agricultural commodities to Communist nations.	Agriculture
HR 8531	Fascell	Set 35% import duty on processed shrimp.	Ways & Means
HR 8691	Mills	Enact new schedule of tariff classifications.	Ways & Means
S 2292	Thurmond	Subject labor unions to antitrust laws on same basis as corporations.	Labor
S 2323	Keating	Establish Consumer Counsel in President's Office.	Gov't Operations
S 2414	Wiley	Create research lab to develop industrial uses of dairy products.	Agriculture

ACTION TAKEN

BILL	SPONSOR	OBJECTIVE	STATUS
HR 5463	Cooley	Extends Sugar Act to June 30, '62.	Passed both Houses; signed into law.
HR 6253 S 1462	Hagen Engle & Kuchel	Establishes minimum quality standards for grape, plum, exports.	Passed both Houses; signed into law.
S 1643	Ellender	Administration's farm bill. Exempts from marketing orders fruits and vegetables for canning-freezing except apples, asparagus, cherries, cranberries, grapefruit, olives grown in certain states.	Passed both Houses; signed into law.
HR 2010	Gathings	Extend Mexican farm labor program to Dec. 31, '63.	Passed House; reported by Senate Agric. Comm. with amendments giving Labor Secty. added powers over hiring.
S 608	Dodd & Bush	Establish shellfish research center in Milford, Conn.	Passed Senate; reported by House Fisheries Comm.
H Res 240	Anfuso	Create "select committee" to study consumers problems.	Tabled by Rules Comm.
HR 1233	Steed	Give FTC temporary cease and desist orders against certain acts pending completion of case.	Approved by Commerce Comm.
HR 7812	Zelenko	Require federal registration of contractors of migratory workers.	Reported by Labor Comm.
S 1123	Williams	Prohibit children under 14 from working on farms.	Approved by Labor Comm.
S 1124	Williams	Provide up to $2.5-mill. in federal aid for education, training of migratory workers.	Approved by Labor Comm.
S 1128	Williams	Compel contractors of migratory workers to register with Labor Dept.	Approved by Labor Comm.
S 1130	Williams	Provide up to $3-mill. in federal aid matching grants for medical care of migrants.	Approved by Labor Comm.
S 1132	Williams	Create 15-member National Advisory Council on Migratory Labor, appointed by President.	Approved by Labor Comm.

FOR SAFE • EFFICIENT • ECONOMICAL HANDLING OF LIQUID FOODS AND BEVERAGES



Specify TYGON® B44-3 Clear Flexible Plastic TUBING

EASY TO SET UP, CHANGE — Lightweight, flexible, easy-to-handle Tygon Tubing, Formulation B44-3, requires a minimum of couplings and fittings, is readily snaked around obstructions to speed set-ups, simplify revisions as needs change. (In addition, when used in conjunction with a rigid system, Tygon will greatly increase its versatility.)

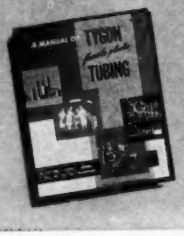
EASY TO CLEAN AND SANITIZE — Tygon's smooth, dense bore is easily flushed clean, will withstand the harshest cleaning and sanitizing agents. . . . Its excellent wetting properties facilitate complete drainage. . . . Its clarity provides a quick and easy visual check on cleanliness.

ODORLESS, TASTELESS, NON-TOXIC—Tygon will neither impart nor absorb tastes or odors, can be safely used with even the most sensitive foods and beverages*. . . . And, of course, Tygon complies fully with the FDA's Food Additive Amendment.

LONG SERVICE LIFE — Tough, abrasion-resistant Tygon won't age and harden, has a flex life 10 to 12 times that of rubber.

WIDE RANGE OF SIZES—Tygon is available in running lengths in 73 standard sizes, from 1/16" I.D. x 1/8" O.D. to 4" I.D. x 5" O.D., including 7 sizes braid-reinforced for higher working pressures. See your local distributor.

**For processed milk and milk products, use formulation B44-4X.*



Compare the unique advantages of Tygon Tubing B44-3, especially developed for handling liquid foods and beverages, with any other piping medium and you'll see why more and more bottlers and food processors are using Tygon. Write today for FREE Bulletin T-100R.

32-H

PLASTICS AND SYNTHETICS DIVISION

U. S. STONEWARE
AKRON 9, OHIO

TYGON is a registered trade-mark of The United States Stoneware Company.

What will the foods of the future be like

PFIZER PRODUCTS FOR THE FOOD INDUSTRY
BEVERAGE
Citric Acid, Ascorbic Acid, Sodium Citrate, Sorbistat®-K (Potassium Sorbate), Calcium Cyclamate, Sodium Benzoate, Tartaric Acid, Caffeine, Erythorbic Acid (Isoascorbic Acid)
MILLING & BAKING
Bi-CAP (flour enrichment mixtures), L-Lysine, Glucono-Delta-Lactone, Cream of Tartar, Citric Acid, Sorbistat®, (Sorbic Acid), Sorbistat®-K (Potassium Sorbate), Sodium Benzoate, B Vitamins, Sol-U-Pak®
DESSERT
Citric Acid, Ascorbic Acid, Sodium Citrate, Fumaric Acid, Calcium Cyclamate, Calcium Gluconate, Sorbistat® (Sorbic Acid), Sorbistat®-K (Potassium Sorbate)
CANNING PRESERVING
Citric Acid, Ascorbic Acid, Sodium Citrate, Calcium Cyclamate, Sodium Benzoate, Tartaric Acid
CANDY
Citric Acid, Ascorbic Acid, Calcium Cyclamate, Tartaric Acid, Cream of Tartar, Sorbistat® (Sorbic Acid)
OIL & FAT PRODUCTS
Vitamin A & D, Beta Carotene, Citric Acid, Sodium Benzoate
FROZEN FOOD
Citric Acid, Ascorbic Acid, A-C-M®
DAIRY
Citric Acid, Sodium Citrate, Vitamin A, Sorbistat®-K (Sorbic Acid), Sorbistat®-K (Potassium Sorbate), Vitamin A Palmitate, Types M & W
MEAT PACKING
Citric Acid, Ascorbic Acid, Erythorbic Acid (Isoascorbic Acid), Sodium Erythorbate (Sodium Isoascorbate), Sodium Ascorbate, Biostat®-PA (Oxytetracycline), Sodium Citrate

Whatever the form or content of tomorrow's foods, they will owe something to the research laboratory of today. If you are working to develop new food products, or to improve present ones, the end to your search may be as close at hand as your Pfizer representative.

The name Pfizer has been synonymous with highest quality ingredients and service for the food industry for more than 110 years. This reputation results, in no small way, from the contributions of Pfizer Technical Service.

Our customers have come to rely on our many products and on our readily available technical service "team" at every stage of product development—from research to finished production.

For example, when manufacturers of "convenience" mixes—general-purpose and specialty baked goods—wanted a more controlled type of leavening action, Pfizer offered Glucono-Delta-Lactone. This chemical leavening acid imparts no unpleasant aftertaste, yet helps provide products having excellent volume and fine even texture. G-D-L's high stability in storage also insures longer shelf life.

Mold and yeast growth had been causing food-freshness problems in cheese, wines, prepared salads, and baked goods. Today, Pfizer Sorbistat®-K and Sorbistat® provide the means to ensure a "stay fresher longer" quality in such products.

In the nutritional area, Pfizer L-LYSINE has made possible great strides in improving the protein quality of grain-based foods ranging from breads to breakfast cereals . . . without affecting the taste or texture of the product. This essential amino acid "activates" the protein potential present, thus improving the total protein quality.

These few examples merely typify Pfizer's experience and willingness to help. Let us prove that our products and personnel can help solve your problems.

If you have a food product problem, look to Pfizer first.

Science for the world's well-being®

Pfizer

CHEMICAL DIVISION

Chas. Pfizer & Co., Inc.
Chemical Division
New York 17, N. Y.

HAM CAN CONVENIENCE

NON-DAIRY COFFEE CREAMER

CANNED BREAST OF TURKEY

new packages & products

PICTORIALS FOR SALADS

EASY-OPEN HAM CAN HAS SAFETY-EDGE, TOO

Ham can opening, long a problem for housewives, should be eased considerably by a new easy-open can with safety-rolled edges.

Familiar pear shape is retained in the new container, along with a key and scored tear strip. But strip is repositioned to provide "guide rails" that direct tearing and curling. Can's edges are actually rolled in the opening process.

New container, from American Can Co., has toughened and redesigned key for greater leverage. (311)

NON-DAIRY CREAMER DEBUTED BY CARNATION

A barrage of TV and newspaper advertising is scheduled to support national introduction of Coffee-mate, a coffee creamer developed by Carnation Co.

A non-dairy product, apparently based on a vegetable fat, Coffee-mate needs no refrigeration and dissolves instantly. Other features are a whiter and more appetizing appearance.

Two consumer prices are offered —suggested 29¢ and 49¢.

ARMOUR INTRODUCES CANNED BREAST OF TURKEY

Fully - cooked, ready - to - serve boneless breast of turkey, packed with all the convenience and menu versatility of a canned ham, is now being marketed for food service and delicatessens by Armour.

Packed in pear-shaped cans of approximately 9-lb. each, new product carries the Cloverbloom brand. Advantages claimed are: Ideal for machine or hand slicing, regular refrigeration storage, and minimum storage space. Cooked in can in its own juices, meat retains natural flavor, aroma, and juiciness. Close portion and inventory control cuts waste and targets cost.

OFFER STOCK PICTORIALS FOR SALAD PACKERS

Pictorial metal lids teamed with table-ready paper tubs are expected to increase retail salad sales for packers and supermarket operators.

Three new process color clo-

VERSATILE BERRY SHIPPER

FROZEN POTATO PANCAKES

SALADA'S BANAN-O, GELATINE

sures depict appetizing servings of macaroni, cole slaw, and potato salad. Gourmet line of tubs include three color combinations of 16-oz., table-ready stock designs. Tub construction features a leakproof and tamper-proof seal, easy refrigerator stacking, and rapid, automatic capping.

Continental Can Co. supplies both tubs and lids. **(312)**

PIGGY-BACK CONTAINERS FOR BERRY GROWERS

"Piggy Pak," a versatile new corrugated container, is claimed to reduce handling time and expense during picking, storing, shipping, and merchandising of berries and other fruits.

Container holds eight quarts of product and features an integral, raised handle which runs lengthwise in center of tray and divides tray into two sections. To stack for storage, shipment or display, handle of one tray fits into a recess in bottom of the tray above, locking the two together. No nailing or wiring is needed.

Maker, Stone Container Corp., also notes that growers can use the "Piggy Pak" as a picking basket during harvest and eliminate transfer of berries from baskets to shipping crates. **(313)**

PACKAGE DESIGN PROMOTES FROZEN POTATO PRODUCT

A full color photograph in a fashionable kitchen setting provides distinctive package appeal for Golden Glow brand frozen potato cakes from Better Living, Inc., Milwaukee.

Cartons, from KVP Sutherland Paper Co., are printed in five color lithography on "Ultra-Cote 80" solid cylinder board with a high gloss "crystal-cote" finish.

Potato product is packaged in a polyethylene pouch inside the opposite-tuck carton. Carton style is adaptable to hand-closing as well as fully automatic packaging operations. **(314)**

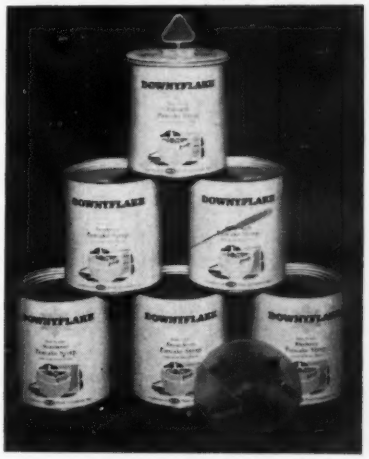
SALADA FOODS TESTS TWO NEW PRODUCTS

Two new products from Salada Foods are now in test markets—an unflavored Junket gelatine and Banan-O, latter in three flavors: banana chocolate, banana strawberry, and plain banana.

Gelatine is sold as a supplementary protein food for use in low calorie or high protein diets, or as an all-purpose gelatine. Product is packaged with individual servings wrapped 32 polyethylene-coated envelopes to a box.

Banan-O is composed of pure banana flavor crystals and is said to be the first product of its kind to use real bananas instead of a synthetic flavoring. Like the gelatine product, Banan-O is packaged to individual servings but in a triple-ply packet of paper, foil, and polyethylene. Each box contains 14 servings.

Both Junket gelatine and Banan-O packets are produced by Milprint, Inc., using Bakelite polyethylene. **(315)**



INSTITUTIONAL SYRUP PACK

ASSORTED SYRUP PACK HAS PLASTIC POUR SPOUT

Seven flavors of Downyflake Pancake Syrup are now being sold in convenient "ready-to-use" form by the Institutional Products Div. of DCA Food Industries.

Featured is a space-saving as-

New efficiency means you can now handle many mixing jobs with a smaller model drawing less power.
New shock-protected internal gear turns the mixer shaft at a slower, more powerful 350 rpm.
New super-pitch prop delivers up to 45% more fluid flow than previous LIGHTNIN gear-drive models . . . higher impeller head in direct-drive models.
ANNOUNCING

a new level of competence in the mixing of fluids

You get more work out of these all-new LIGHTNIN propeller-type mixers.

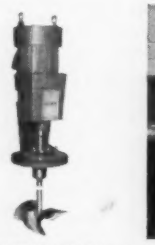
They'll handle bigger batches, heavier materials, or do the job faster —*without using more power.*

Often a smaller, lower-cost model will do the job you want done—*on less power than you've been using.* That's how efficient they are.

In normal use, you won't have to lubricate these mixers for five years. Overloads can't hurt the gear drive. The chemical plant motor is standard, at no extra cost.

Notice how we've moved the lower shaft bearing and chuck up out of the mixer base, away from the splash of tank contents. And you don't need three hands to change the shaft. New quick-acting chuck locks it tight when you turn one screw.

They're ready in eight sizes from ¼ to 3 hp, gear drive or direct drive. Ask your LIGHTNIN Mixer representative for details. His name is in Thomas' Register and in the yellow pages of your telephone directory. Or write us for descriptive Bulletin B-521.



FOR CLOSED TANKS. Same all-new design, with new stuffing box or rotary mechanical seal. Also described in Bulletin B-521.

PORTABLES, TOO. New indexing feature makes it a snap to set mixer at the correct angle. Nine sizes, ¼ to 3 hp. Request Bulletin B-520.

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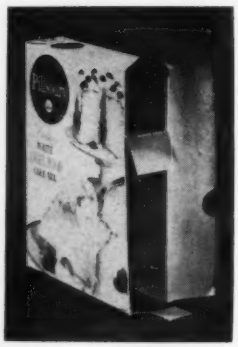
MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 143-j Mt. Read Blvd., Rochester 3, N. Y.

In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 19, Ont.
In Europe: Lightnin Mixers, Ltd., Poynton, Cheshire, England

sorted pack of six No. 10 tins, containing one each of strawberry, blueberry, boysenberry, pineapple, spice apple, and raspberry.

For added convenience, a plastic cover spout is enclosed with each case to pour syrup directly from can.



COMPARTMENTED CARTON is being used by the Pillsbury Co. for its line of Angel Food Cake Mixes. Carton, lined with glassine, is divided into two sections, one containing egg white mix, the other cake flour mix. Supplier is Packaging Corp. of America. **(316)**

New Product Shorts

General Foods is blanketing the Boston area test market with Brim, a "breakfast in a glass." It's a beverage powder which, when mixed with milk, provides a protein-rich drink.

National Biscuit Co. plans to make Survival Ration Crackers available to interested federal, state and local Civil Defense organizations, government agencies, and industrial groups next month. Each cracker contains approximately 30 calories. A daily diet of 66 crackers and two quarts of water will provide 2,000 calories, enough to sustain a normal adult in good condition for up to two weeks. Eighteen wax wrapped packets of 13 double crackers each will be packed in a hermetically sealed tin. The tin, containing 7-lb. of crackers, will be lithographed in four colors and bear a complete description of the product, its use and storage.

Packaging Briefs

Tamper proof seal for aerosol cans is being introduced by Pharmaplastics, Inc., Baltimore. Seal assures full content, guards against indiscriminate sampling, and prevents premature release of product. **(317)**

Specialty Flavor stock designs for ice cream cartons are available from Riegel Paper Corp. Called the "Highland" and the "Dutch Girl," full color cartons are designed for pictorial tie-ins with a variety of flavors. **(318)**

CIRCLE 26 ON INQUIRY CARD

CIRCLE 27 ON INQUIRY CARD →

Dramatic package for "Tiger's Milk" Cookies gives Burry a running start in new market

Burry Biscuit Corporation chose Riegel for both design and production of this colorful orange and black cellophane wrap for "Tiger's Milk" cookies . . . protein and vitamin-enriched.

Burry's new unit is an example of Riegel's ability to design and produce both protective and sales-boosting packages.

We've a flair for thinking of every product as something *special* . . . and developing for it the one best packaging answer . . . be it film, pouch paper, glassine, foil, or combination . . . printed, coated or plain. Write for more information today . . . for the new ideas come from Riegel.

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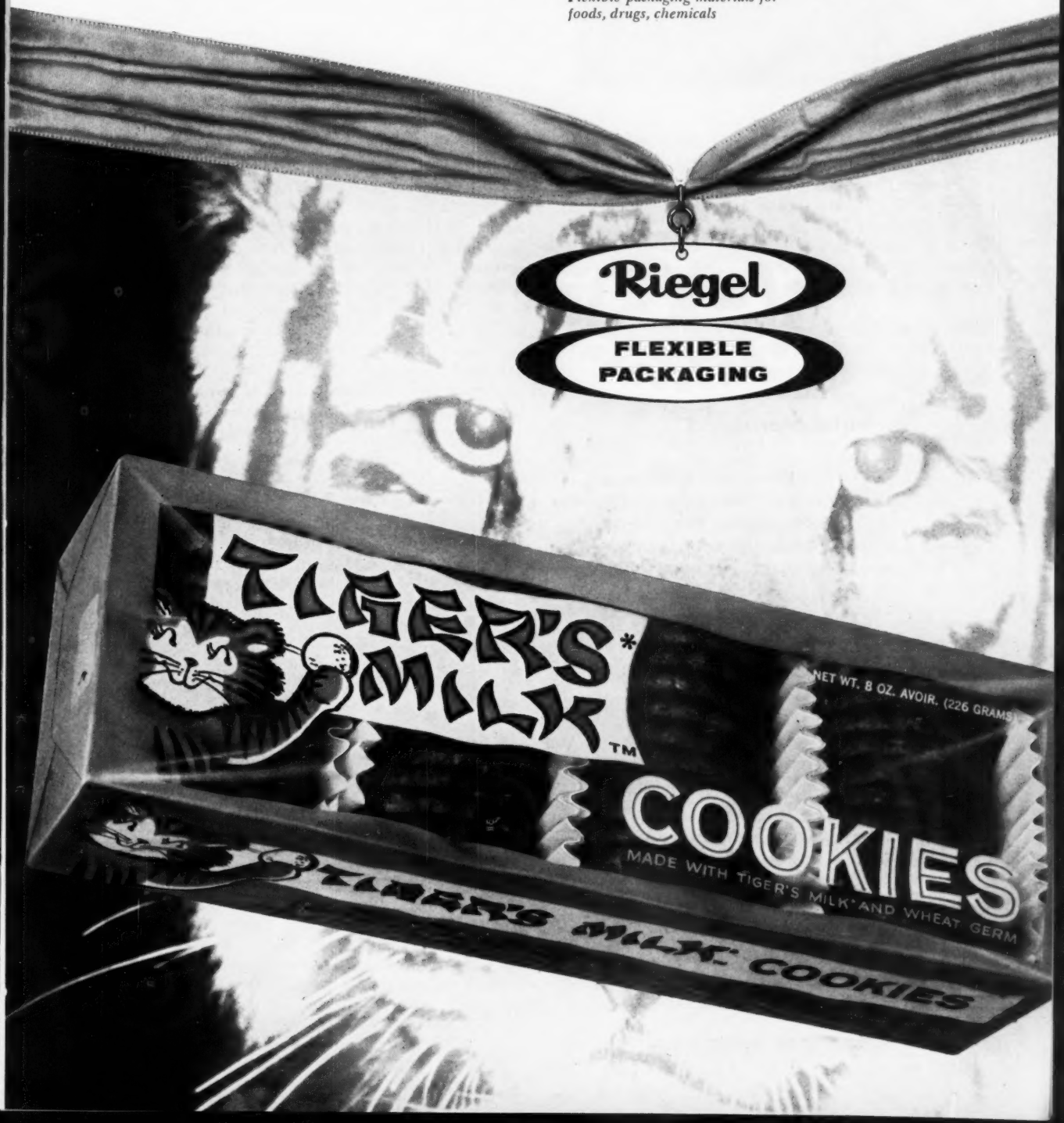
Flexible packaging materials for foods, drugs, chemicals



unscrambled

Unscrambling odd-shaped jars get you jumpy? Unscrambling bottles give you butterfingers? Buy your A-B-C Case Unloader and Unscrambler. It can handle more bottles than a million eager-beaver milkmen. Requires no operator, cuts costs. Reduces breakage, too. Want to know more? Contact us. Right now. *Scramble!*

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P.O. Box 1146, Clearwater, Florida

Packaging Pointers

Shape of Things To Come?

A hint of what critics of deceptive packaging are driving at is contained in Canada's new food label law which goes into effect Jan. 1, '62.

Briefly, law requires that main panel f a package carry the brand name, common product name, and net contents. **Significantly, weight will have to be listed "in close proximity" to the product name without intervening printed or graphic matter.** Also, the type size used for listing the contents must be related to the size of the main panel, and must be bold-face. If the main panel area is between 20 and 40 sq. in., say, the type must be at least ⅛-in. tall.

For further information, write to: Inspection & Enforcement Services, Dept. of National Health & Welfare, Ottawa, Canada.

Power of a Package

Drive by banana producers to tone up profits with better packaging appears to be paying off. Standard Fruit & Steamship reports that the $3,412,000 deficit of 1960's first half was sharply pruned to a $544,000 loss in the '61 period. Pres. J. S. D'Antoni traces the improvement "to the price increase which was realized now that all bananas are being sold in Cabana boxes instead of stem form." The price gain, he adds, more than offset costs of the box and the processing involved.

United Fruit's Jesse E. Hobson, vice pres.-research, in a recent talk spelled out the benefits of boxing the fruit at the point of origin. Said he: "We can secure a better market price, improve quality and appearance, and all but eliminate wastage. For the first time, we can brand identify our product."

Prices: Some Up, Some Down

Costs of packaging materials showed a mixed picture last month. To keep their cans competitive with the new lightweight tins, aluminum producers shaved 7-9% off the price of coiled sheet. Reportedly, move lowers the per lb. price from 30.7¢ down to 28¢.

On the other hand, it looks as if you'll be paying from 8-14% more for shipping containers. Continental Can and Crown Zellerbach led the way in hiking prices of corrugated materials.

More Info Wanted on Meat Wraps

Cooking hints on meat packages, to make up for the disappearance of the advice-dispensing butcher, will make homemakers buy a wider range of cuts. So declares Max Watson, R&D director of Paramount Paper Products.

A survey by his company, Watson says, shows that women aren't taking advantage of the wider variety of meat cuts available because they don't know how to prepare them in the home. What's needed, he suggests, are packages that include information on cooking temperature, method, and time, as well as seasonings to use.

Poly Sweeps Bakers Along

Demand for polyethylene breadwrap is spurting well ahead of estimates, according to Vincent D. McCarthy, director of plastics sales, U. S. Industrial Chemicals. Earlier, USI figured that bakers this year would use 8-10 mill. lb. of the plastic vs. 3 mill. in '59, 6 mill. in '60. Now, USI believes consumption "will be no less than 20 mill. lb., may go as high as 30 mill."

McCarthy cites 3 factors powering the breakthrough: 1) lower prices, 2) better overwrappers, and 3) more thorough operator training.

Peek at Tomorrow

Along with the hunt for new products to whet Milady's appetite goes the search for more convenient-type packages. Here are four possibles turned up by Ekco-Alcoa's continuing R&D program:

. . . **Rigid foil bacon unit,** containing 4 or more slices hermetically sealed in continuous strip.

. . . **Cook-in foil egg shells** (round rigid pouches) marketed in single or multiple units, can be heated in toaster or boiling water.

. . . **Foil butter package** dispenses measured portions, has snap-on cover for reclosure.

. . . **Functional spice and sugar dispenser** has smooth foil container sealed in movable sleeve.

BRIEFS

Filling line that tests out at 1100 cans/min. was installed at Pittsburgh Brewing.

Popularity of draft beer in the home due to spread, as result of introduction of simple equipment for tapping kegs. Latest innovations permit easier drawing of product as well as tighter seals to retain natural carbonation of beer.

Large-size bottles help: Consumers who buy milk in gallons use 14.7 qts. a week compared to 11.6 for half-gallon users, and 8.6 for quart buyers. So reports American Dairy Assn. survey.

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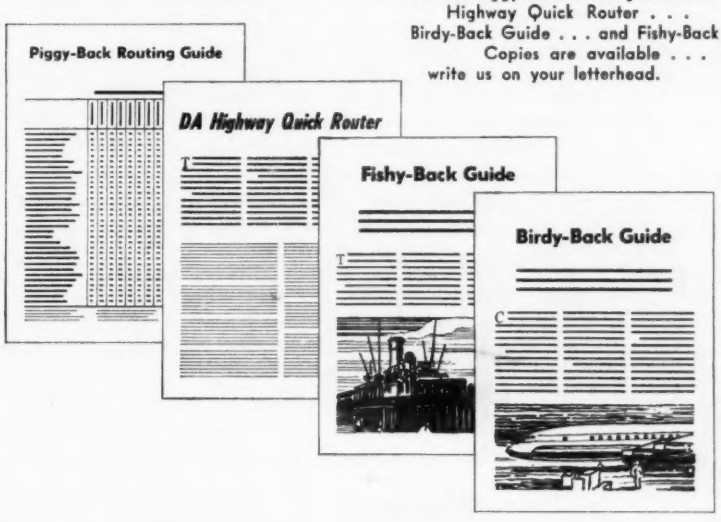

A Chilton Publication, Chestnut and 56th Streets, Philadelphia 39, Pa.

CIRCLE 31 ON INQUIRY CARD

Where will you use this nutritious lubricant?

Here is one member of a unique class of products, *Myvacet® Distilled Acetylated Monoglycerides*. It can now be used in food equipment.*

It will be used because it offers much more than excellent lubricating properties. It is wholesome and nutritious. It is free from taste or odor, and stays that way because it forms no rancid odors or gums. It far outperforms traditional edible oils in resistance to oxidation.

As a lubricant, it works well even under pressure. Compared with ordinary edible oils it has greater polarity. This allows it to orient on various surfaces to form more tenacious films which last and last.

For samples and more information on the various types and viscosities of *Myvacet Distilled Acetylated Monoglycerides* available, write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies, Inc., West Coast • Charles Albert Smith Limited, Montreal and Toronto.

*U. S. Food & Drug Regulations, Sec. 121.1018

Suggested applications for *Myvacet Distilled Acetylated Monoglycerides*

Confectionery—Slab dressing; release agent for molds, tubs, and bowls; lubricant for machinery and cutting knives.

Baking—Divider oil, trough and pan grease, lubricant for slicing equipment.

Meat Packing—Packer's oil, cutting-knife and slicer lubricant, general-purpose lubricant for meat-processing equipment.

Dairy—Lubricant for valves, filler pistons, capping machinery, and other equipment.

Canning, Packing, and other Food Processing—Lubricant for any operation where contamination of foodstuff is a possibility.

producers of ***Myvacet®***
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Also . . . Myverol Distilled Monoglycerides . . . vitamin A for foods and pharmaceuticals

Distillation Products Industries *is a division of* **Eastman Kodak Company**

Don't Be Counted Among Nontechnical 93%

Some 7 percent of all food processing companies had scientists and technicians on their payrolls. That is what a National Science Foundation survey reveals. In what year was this low percentage of scientists found in our great industry? Not '09, but '59.

Companies with 5,000 or more employees looked considerably better than the average. A nice 97 percent of those hired technical know-how. But what's wrong with top management in the other 3%?

One in 25 has technical brainpower

Now hear this! Of firms with less than 100 employees, only 4% hired technology to speed progress and help profits.

This statistic reads better turned around. Food companies which do not utilize technical talent seldom are sufficiently successful to have more than 100 employees. Worse, at the pace of today's progress in products, packages, and processes, these companies will be hard-pressed to stay in business.

Now consider this: Expenditures for research and development in '58 totaled a paltry $80 million. Company financed research and development expenditures were allotted a whole 0.3% of sales in '57. The figures should be five times that.

True, food manufacturing is a tremendously competitive business with low per unit profit margin. But to protect that margin, the pacesetters heavily finance new product and package development, process improvement, and greater worker productivity through technical superiority.

What is the price of technology? The NSF survey came up with this: In '57 the food and kindred products manufacturing industry reported an average annual research and development cost of $20,200 per scientist, including engineers. In this figure are salaries, cost of materials and equipment, and other direct and supporting costs, plus some overhead. Some 62% is for wages and salaries.

Can't afford not to pay for progress

At today's rates, many plants with 99 employees will pay out close to $400,000 annually in wages. For about 5% of that, or the cost of five laborers, one man-unit of technical progress can be achieved.

Any technical food man worth his salt can much more than pay his way in most types of food plants with 50 to 100 workers. He can do that by boosting productivity and improving and controlling quality. As bonus you can get package improvement, new product formulation, and a sanitary plant that may save your reputation and your business. You also have technical control over additives and labeling statements—both policed by Federal agencies.

If you fear you can't keep a technical man busy, organize more projects to justify his help.

It's not that you can't afford it. This reads the other way, too. You can't afford not to do it.

a progress report on "Immersion Freezing" from Airco

The use of liquefied gases as freezing agents opens impressive new possibilities for progress in the food industry. "Immersion Freezing", as this process is known, holds promise of faster production, higher quality standards and the availability of totally new food products.

"Immersion Freezing" has received much publicity which, like many new major technological breakthroughs, is accompanied by rumors and claims that tend to distort the picture. The purpose of this report is to provide a factual evaluation of the process and its potential.

Air Reduction Sales Company, through its Cryogenic and Special Products Departments and its Customer Service Laboratory, has been a pioneer in "Immersion Freezing". The facts in this report are based on two years of development and evaluation. We trust this report will provide the reader with reliable information that will enable him to evaluate the potential of "Immersion Freezing" in relation to his own operation.

"Immersion Freezing" is an almost instantaneous freezing process which involves the immersion of food products into a liquefied gas. It requires custom designed equipment. "Immersion Freezing" with liquefied gases is going to be more expensive in unit freezing costs than conventional freezing techniques. This higher basic cost, however, may be more than offset by what Airco technologists call the XYZ factors.

X—Quality improvement
Y—Increased production
Z—New product possibilities

FACTOR X

Represents improvement in quality. Quality to the frozen merchandiser might be expressed in improvements in flavor, color, vitamin retention, tenderness . . . resulting in better over-all consumer acceptability.

For example:

1. Strawberries frozen with liquefied gases retain normal color and close-to-normal texture.
2. Meat has better color and is more tender.
3. Whole kernel corn now has no loss in kernel constituents or vitamins, on-the-cob flavor is retained.
4. Ice cream has more uniform texture and appearance.

FACTOR Y

Represents improvement in production or throughput. The use of liquefied gases as expendable refrigerants allows the food freezer to supplement existing refrigeration for peak seasonal loads. Improvements in throughput may provide many savings in processing to the frozen food packer.

For example:

1. The hardening room can be by-passed in the freezing of ice cream.
2. A shorter freezing cycle allows reduction in the floor space requirements in many processes.
3. The freezing of cut-up poultry can be a continuous process, by-passing freezing storage and extra handling.
4. In the freezing of whole kernel corn, yield may be increased by as much as 25%.

FACTOR Z

Represents the ability to freeze products which cannot be successfully frozen by any other means. Following are some of the advances made by Airco in this all-important area of new product development:

1. CITRUS CELLS—After immersion of a peeled orange, grapefruit, lemon, lime or other citrus fruit in a liquefied gas, the product can be reduced to individual citrus cells. These individual citrus cells can be used in a variety of applications—ice cream, cottage cheese, confectionery products, orange juice concentrate.
2. TOMATO SLICES—"Immersion Freezing" of tomato slices or wedges yields a highly acceptable product. The extremely fast freezing results in a product which, when thawed, closely approximates the fresh tomato.
3. SLICED BANANAS—Bananas frozen by immersion in liquefied gases retain a high percentage of their original appearance, color and texture.

All aspects of "Immersion Freezing" covered by Airco's XYZ factors are in various stages of development by Air Reduction's Customer Service Laboratory. Only one of them is in commercial production at this time. They are listed here to demonstrate the possibilities for better quality, production savings and new products which may offset the higher initial cost.

DEVELOPMENT OF DATA:

The development of sound technical and engineering data is the basis of the Air Reduction approach to this field. Following is information based on Airco studies covering areas where care must be exercised in the application of "Immersion Freezing".

1. Liquid nitrogen is not an effective bactericidal agent.
2. Pre-cooling or other forms of treatment are sometimes required prior to "Immersion Freezing".
3. Some packaging materials, adhesives, glues, etc., will not withstand the extremely low temperatures resulting from liquefied gas freezing.
4. Enzyme systems appear to function even at these low temperatures.
5. Each product requires individual evaluation for freezing by this method.

SPECIAL EQUIPMENT NEEDED:

The Special Products Department of Air Reduction Sales Company is developing the freezing equipment for "Immersion Freezing". Each product will require custom designed equipment for freezing. Design considerations include throughput requirements, product characteristics, handling equipment and packaging requirements.

The Cryogenic Engineering Department of Air Reduction is developing closed cycle refrigeration systems using either liquid nitrogen or nitrous oxide. These systems will take into account the normal operation of the producer's plant, seasonal characteristics of growing or harvesting of product, stability of the market, etc. Capital requirements for this type of freezing system are considerable and, therefore, long-term use agreements with adequate guarantees and financing will be required.

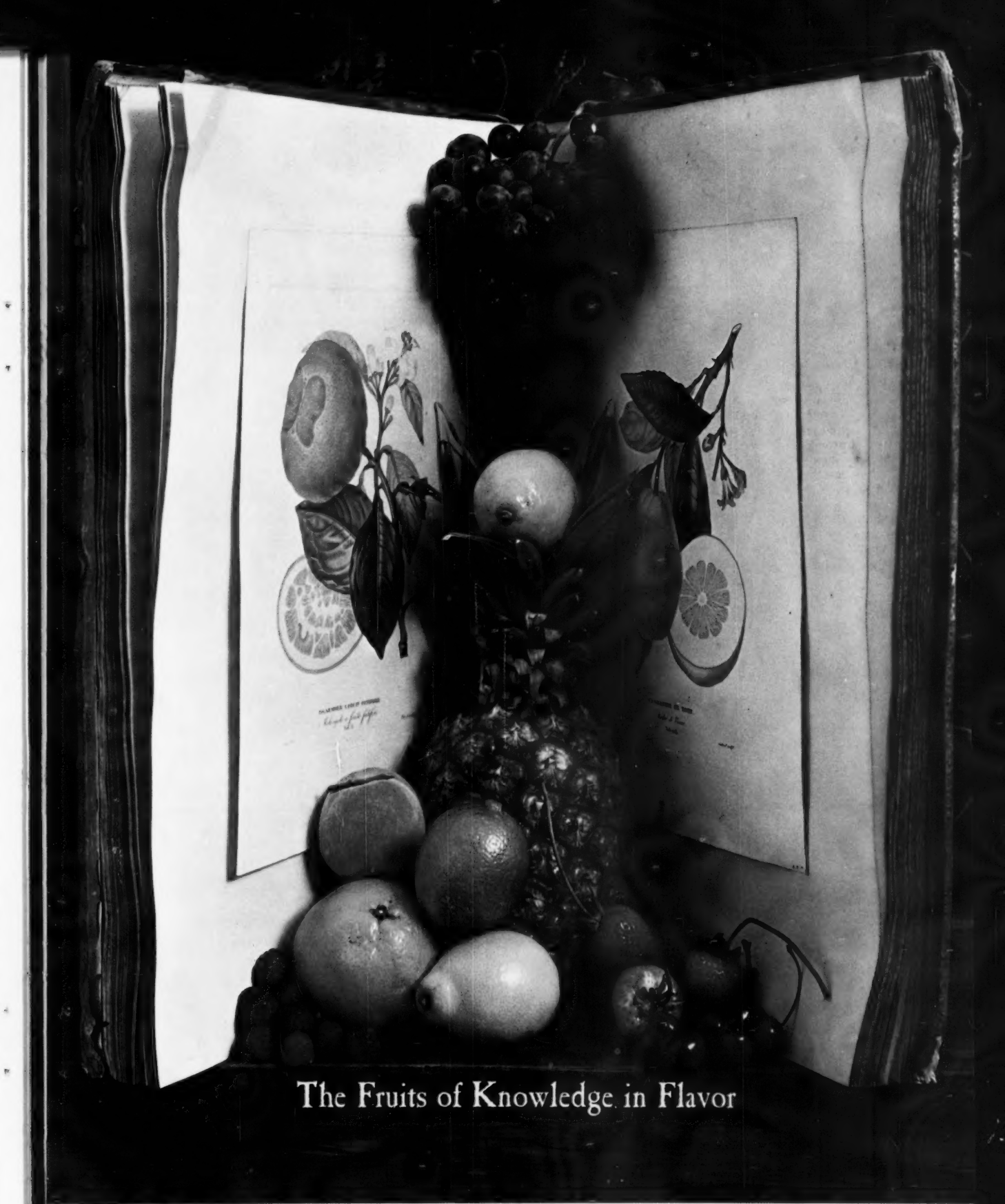
Readers are invited to write to Air Reduction Sales Company for additional information, or for advice concerning specific freezing problems.

AIRCO®

AIR REDUCTION SALES COMPANY
Customer Service Laboratory
1400 East Washington Ave., Madison 10, Wisconsin

CIRCLE 34 ON INQUIRY CARD

CIRCLE 35 ON INQUIRY CARD ➔



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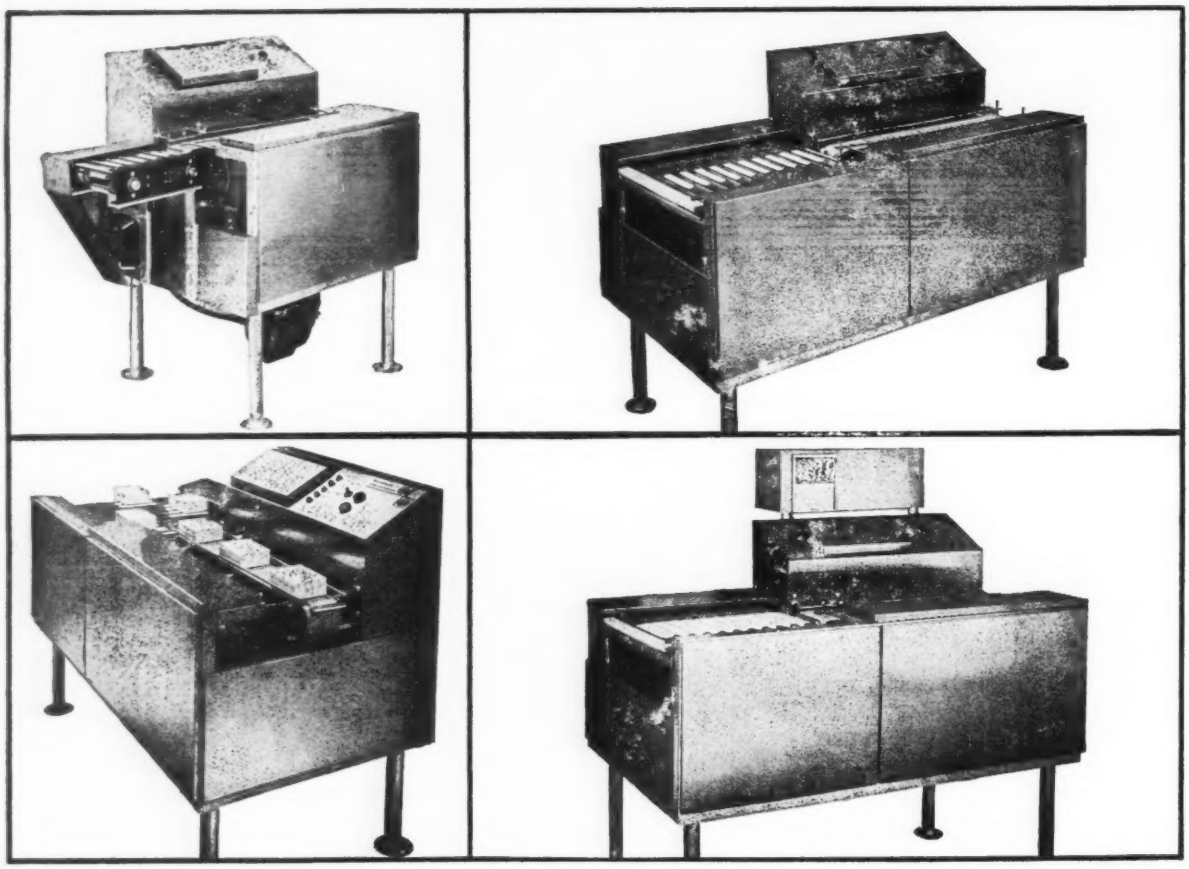

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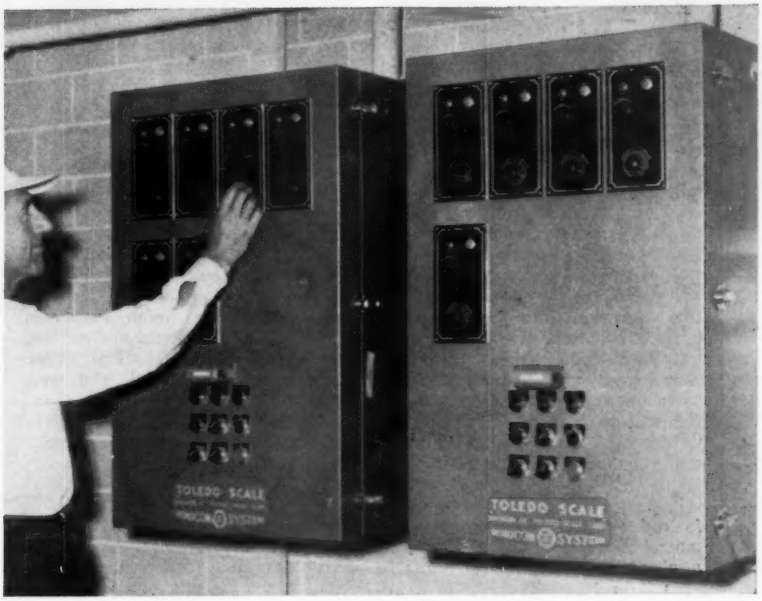


OPERATOR SETS desired weight for each meat ingredient on proper panel. As ingredients are fed to scale hopper, pilot lights indicate batch cycle progress.

Libby Automates New Plant

Sets pace in processing with automatic batching and proportioning, innovations in cutting and can filling, vertical sealing, palletless handling

BIG ADVANCES in processing and packaging have been engineered into a new multi-million dollar plant by Libby, McNeill & Libby.

The new Chicago food factory is a single-story structure with 600,000 sq. ft. of floor space. It is laid out to eliminate unnecessary motion, jammed areas, and waste of space—as well as to permit flexibility.

Thirteen straight-through lines produce 20 varieties of canned meats at a tremendous rate of 850,000 cans a day in one shift.

A key facility in the new plant is the automatic batching of ingredients. Remote weight selecting and formula changing is accomplished through three separate weight-control systems (Toledo Scale's Remocom). These batch-sequence ground meats into mixing and emulsifying operations with automatic handling. Systems have been adopted for potted meat, hash, and Vienna sausage lines. They provide great speed, flexibility, accuracy, and economy of operation. Moreover, precision weighing assures economical use of ingredients and duplication of formulas.

Central panel-operated systems are wall-mounted in foremen's offices. They're equipped with four to six dial-selector switches (one for each kind of meat). Through these dial-selective and resetting panelboards, feeding, weighing and scale hopper discharging are automatically controlled.

Speedy, simplified batching is a no-hands operation. Along with electronically operated panelboard controls, new systems comprise a battery of inclined screw conveyors feeding preset amounts of meats from grinders to a scale hop-

JOHN V. ZIEMBA, Senior Associate Editor, Food Engineering, Chicago

How Electronic Batching System Works

When the voltage of a potentiometer operated by the weigh-scale indicator shaft equals that of potentiometer set by weight-selector knobs, the ingredient is discharged into the batch.

Scale output voltage is fed to a remote control station, mounted in foreman's office for easy altering of formulations.

Primary module of control system is a small plug-in unit (Toledo's Remoset), one for each ingredient in the batching system.

It features:

In-out switch—automatically selects ingredient into (or eliminates it from) a batch.

Cycling neon light—lights up when ingredient is being scaled and alerts operator to batch progress.

Preact adjustment—provides premature cut off to compensate for falling column of ingredient while it's in suspension.

Preset weight knob—to program desired weight of ingredient into control system. Knob is a 10-turn vernier dial potentiometer, variable from 0 to 1,000 lb. by 1-lb. increments.

When scale and reference voltages are equal, a cut off relay is actuated to stop inclined screw feeder from charging ingredient into hopper scale.

Preset and Push Button

Once started, system batches automatically on a "discharge-weigh-hold" cycle without manual supervision. Operator simply presets desired weight of each ingredient on the respective selector dial. He then pushes "cycle start" button so that first ingredient is conveyed to weigh hopper at a single feed rate until reaching cut-off weight. Other ingredients then are sequenced into weigh hopper until batch is completed.

When low-level bin indicator signals for batch, weigh hopper discharges. Latter action occurs only when take-away and transfer to post-batching processes are running. Otherwise, weigh hopper will "hold" until interlocks are satisfied. Cycle then repeats as first ingredient is again charged into weigh hopper.

Only operating controls at each line proper are "hold discharge" switches. With those, line personnel can prevent discharge of batches if improper for any reason. Overload protection of weigh hopper is provided through limit switches that stop operating feeder whenever normal batch weights are exceeded.

Fail-Safe Design

Automatic batching system employs full electrical interlocking, based upon "fail-safe" design. Interlocking assures proper batching sequence by closing limit switch contacts before next function starts. Fail-safe design employs electrical and pneumatic components that shut down system to safe condition in event of power or air failure.

System logic isn't lost should power or air fail. Example is stopping a batch in mid-process and its subsequent continuance (from point of stoppage) without product loss, overflow, or batching inaccuracy.

per (with a capacity of 1000 lb.).

Weighing operations start (as with making Vienna sausage) with foreman's presetting four selector switches (one for each type of meat) to predetermined weights for each batch. He punches start button, then weighing and feeding sequences take over on a cumulative basis.

First meat variety discharged from meat grinder drops into hopper mounted above inclined screw conveyor feeding scale hopper. After predetermined weight is reached, first conveyor stops. Then second one starts to deliver another variety of meat, from a different grinder, into scale hopper.

Cycle repeats for automatic feeding-weighing of third and fourth varieties of meats, until accumulated weights for batch are satisfied. Individual and total batch weights are totalized on panelboard-mounted counters.

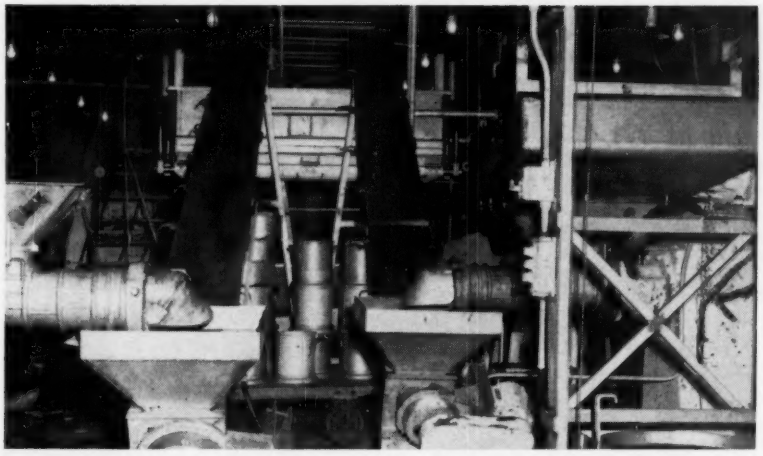
At end of cycle, scale hopper's gates open pneumatically to discharge ground meats into silent cutter through a series of horizontal and inclined screw conveyors.

Potted meat batching operation is similarly carried out. One exception is that two lines have been installed to convey and elevate blocks of frozen meats to Reitz disintegraters.

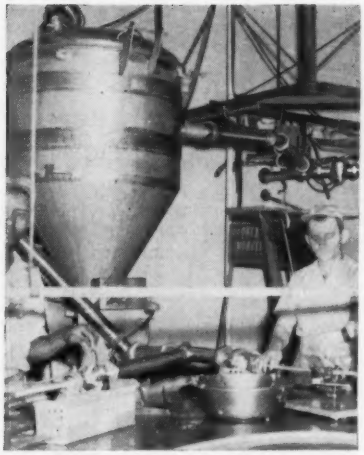
As elevator's bucket drops and strikes a limit switch, it stops to receive block of belt-conveyed meat. As block travels part way through open end of bucket, it contacts a plate-mounted limit switch that actuates elevator's drive motor. Bucket rises and hits another limit switch that stops bucket, tilting it at the same time so that meat block drops into Extructor.

Different, too, is the way ground meats are handled once they've been discharged from scale hopper. In sequence, meat drops into a hopper feeding an inclined screw conveyor charging a 400-gal. stainless jacketed preheat kettle equipped with agitator. From here, meat is pumped (Waukesha) to an emulsifier (Griffith's Mincemaster) and two similar kettles (200-gal. each). Potted meats are then split into two lines, one feeding a 24-valve rotary filler and 6-spindle seamer (for ¼-lb. size cans) and other going to a 10-spout filler and 6-spindle seamer (½-lb. cans).

Hash line differs from the Vienna sausage one in this respect: Corned beef is fed into inclined screw conveyor for automatic batching into scale hopper. Similarly, rehydrated, dehydrofrozen potatoes are screw-elevated into scale hopper. After weights are satisfied, batch drops into horizontal screw conveyor for alternate delivery into two horizon-

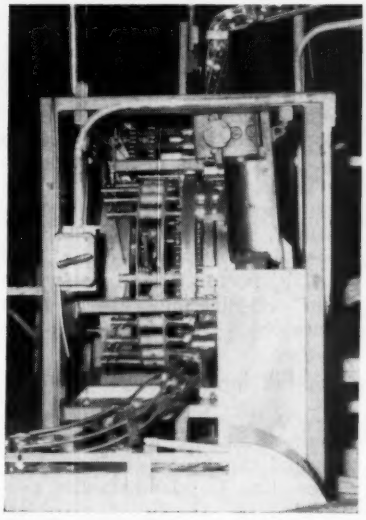


AUTOMATION takes over as meats are discharged from two grinders into hoppers loading inclined screw conveyors that feed into scale hopper at rear.

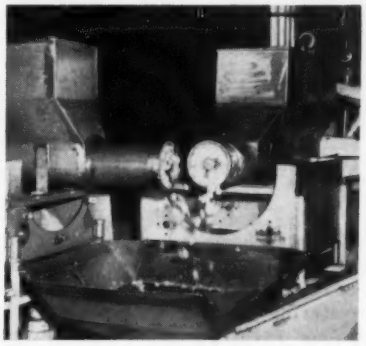


IN CONTINUOUS STUFFING, meat emulsion is piped to vats for pumping into casings.

ON AUTOMATIC Vienna line, sausage is placed into braces for conveyor feeding into cutter-filler.



EMPTY CANS feed into rotary filler pockets (right) and cam-actuated plungers (left) insert cut sausages.



ON BEEF STEW LINE, feeders proportion carrots and potatoes into hopper over screw conveyor that feeds filler.

tal ribbon-type mixers. Batch proceeds to steam - jacketed cook kettles and then 15½- and 24-oz. can-filling lines. This line can be converted to the processing of canned chili beans (with or without meat).

Continuous Stuffing

Advanced methods play a significant role in Libby's automatic Vienna sausage stuffing operation.

Meats discharged from silent cutter pass through an emulsifier (Allbright - Nell). A Waukesha pump carries meat emulsion through stainless steel lines with an air-actuated valve hooked up with Y-fitting. This valve alternately diverts product to two closed stainless surge hoppers, each mounted over a stuffing pump (Viking). Hoppers are equipped with high-low level controls.

Pumps are driven through clutches (Borg Warner). When operator opens a stuffing valve, its lever actuates a limit switch to engage clutch. The pump then extrudes meat emulsion until operator closes valve, and cycle repeats.

Automated Cutting

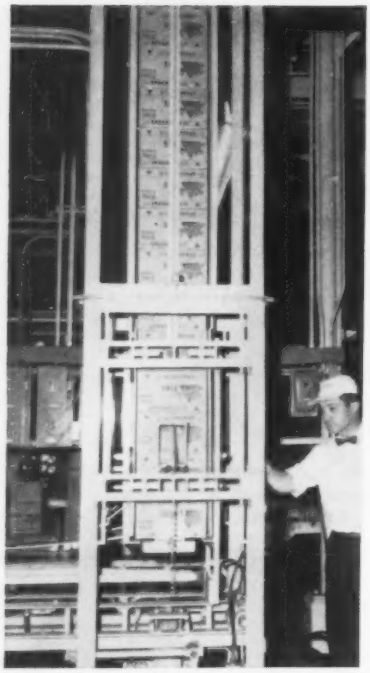
Vienna sausages are automatically cut to length, and two automatic lines take care of all automatic filling not done by hand. Each line now operates at speeds up to 275 cpm.

Girls load lengths of sausages into 16 stainless steel cylinders mounted on an endless chain conveyor. Each cylinder is divided into eleven braces. These are separated by grooves to permit cutting sausages into smaller lengths by a spiral knife. As sausages are cut, the braces make a 90-deg. turn to meet empty cans for automatic filling by cam - operated plungers. Empty cans are gravity-fed into a rotary, 33-pocket disk with a similar number of cam-operated plungers.

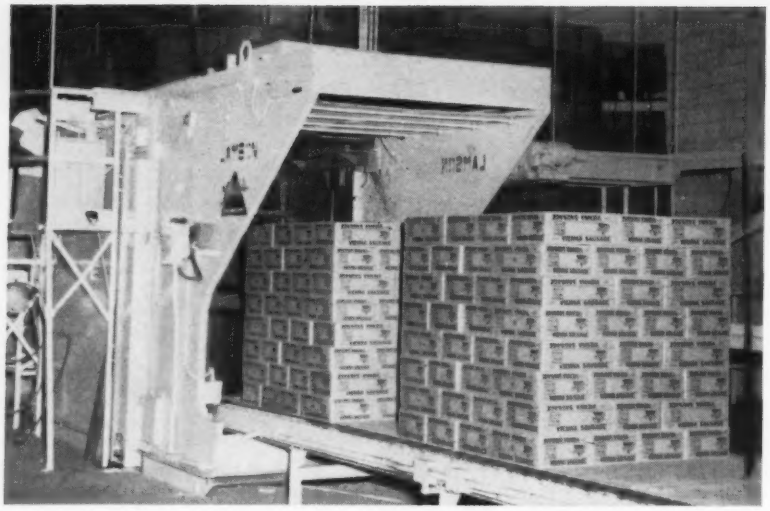
Mechanized Stew Line

Better methods play a dual role on Libby's beef stew line. One's the fully mechanized cutting of beef into cubes that are fed to a rotary pocket-type filler (FMC).

Blocks of frozen beef are first conveyed through a guillotine and cut into 1-in. slices. Then, in turn, transfer belts carry the meat through two batteries of rotary stainless knives. First battery of eleven knives cuts the 1-in. slices into 1-in. strips, while the second cuts the strips into cubes. Beef cubes then continue through an inclined screw conveyor feeding a continuous temperature-controlled steam cooker (Reitz - Thermascrew). (Turn page)



VERTICAL SEALER elevates cases to overhead conveyors. Saves floor space.



Palletless palletizer stacks cases in preset pattern for pickup by clamp-lift truck.

Cubes are cooked in their own juices. These are pan-collected as meats are discharged from cooker onto vibrating - type dewatering tray (Scott-Viner). Then juices are pumped into surge kettle for gravity return to cooker. Excess juice is pumped to cook kettles for gravy preparation and subsequent filling into cans by a separate filler.

Another advanced method is accurate proportioned feeding of a potato-carrot mix into a third filler (rotary pocket-type). Dehydrofrozen potatoes and carrots are separately rehydrated in portable tank trucks hooked up with sanitary pumps supplying hoppers mounted over Draver feeders (Gump). Feeders comprise an adjustable ratchet-gear assembly to drive a horizontal worm-screw a given amount for individual and proportioned discharge of vegetables. This permits in-transit blending in an inclined screw conveyor feeding a rotary, pocket-type filler. Feeders' horizontal scrolls are mounted within stainless steel housing, perforated on bottom to drain rehydrating water from vegetables.

SPAGHETTI is extruded, cut, and automatically funnel-filled into cans.

Can Fill Innovations

Libby installed fully automatic spaghetti making, meat-ball forming, and can filling equipment.

Semolina is pneumatically conveyed from the giratory sifter to a hopper feeding the spaghetti press (Defrancisci). Here, as water is metered into press, dough is kneaded and piped to a battery of extrusion dies. Extruded spaghetti strands are cut to length (11-13 in.) through an adjustable ratchet-gear assembly mechanically linked to a reciprocating knife—a method designed for accurate fills.

The filling of eleven batches, at one time, of cut spaghetti strands in the same number of empty cans, is electrically and mechanically sequenced through a preset timer. Sequenced is the operation of an air-actuated can rack that first pushes eleven empty cans at a time from a start-stop conveyor onto a stainless steel plate. After cans are filled, rack then pushes the filled cans onto a take-away, start-stop conveyor.

Filling spaghetti into cans is aided by a battery of permanently mounted (over cans) combination tapered and cylindrical spaghetti-guiding containers. Cycle then repeats.

Meat balls are automatically prepared on two side-by-side Cut-Rol machines. Hopper - fed meat is auger-extruded, cut to length by a rotary wire cutter. Extruded pieces then drop into a horizontal meat-ball forming scroll for discharge onto a belt conveyor and then to can filling.

Vertical Case Sealer

Seven new compact vertical case sealers (Midnight Engineering) are employed. These effect big savings in floor space—over 250 sq. ft. is available for other purposes. The sealers (5-2/3 ft. wide) occupy about one - fifth the space normally required for conventional horizontal compression belts.

These dual - performers seal cases as they're elevated to overhead conveyors serving as accumulators that feed new "palletless" palletizers. Varying in height to allow for different conveyor levels, these sealers average about 15 ft. and handle 10 to 30 cases in one stack. They operate at speeds of 30 cases per min.

Installed in the warehouse section are two electronically controlled palletizers (Lamson). These are automatically adjustable to handle various case sizes at an average rate of 50 per min. They're designed, too, for palletless handling and stacking by clamp-type lift trucks. The palletizers utilize telephone-type relays and stepping switches. (End)

PULL-TAB OPENER is feature of rigid foil cup Ekco-Alcoa hopes will have a role in packaging of freeze-drieds. Hermetic container, being tested for vacuum packing, takes a heat-sealed, die-cut, vinyl-coated foil lid.

Packaging of Freeze-Drieds

Search for light, air-tight, cheap, rugged container focuses on cans, multi-ply flexibles. Market outlet seen deciding factor. Fill-speeds modest

AS THE first trickle of freeze-dried foods reaches the marketplace, the search for suitable packaging materials is being pressed on a wide front. Spurring the hunt is the general recognition that no one material will answer the tricky problems posed by these new items.

Presently, R&D focuses on containers that will:

► **Keep out water vapor and oxygen.**

► **Protect fragile items from being crushed, as well as resist puncturing by food slivers.**

► **Be light in weight to stretch out product's inherent savings.**

► **Carry a modest price tag to keep freeze-drieds competitive price-wise.**

At the same time, researchers are probing ways to step up filling speeds and carry out packaging in controlled low-moisture environments.

Everyone agrees that the first requirement is a perfect barrier against moisture or oxygen. Reason is obvious: Moisture pick-up can occur quickly (especially in meats), causing caking and/or undesirable enzymatic reactions. Along this line, the lessons learned in developing suitable packaging for instant dehydrated items (like soup mixes, potato products) represent a good starting point for tackling the container problems of freeze-drieds. However, the latter's requirements will be far more critical.

The major technical problems, as put by R. H. Lueck, American Can vice president-research, are: "Physical protection to the products, some of which are rather fragile. Maintenance of oxygen at a low level, not in excess of 2%; and moisture content at a low level, not in excess of 3%. With some foods extremely sensitive to enzymatic activity, even lower levels are essential."

Divergent Paths

Food makers have struck out in two directions in the search for a suitable package—cans and flexible pouches. Cans are liked for their hermetic seal, easier filling, and stability under long storage periods. Pouches are favored for their lightness, potential shapes, and more economical cost. Typical of this split approach are the contrasting containers used for dehydrated soups that contain freeze-dried ingredients — Lipton's flexible pouch, Campbell's aluminum can. (See details p. 46.)

I. J. Phlug, of Michigan State Univ.'s food science department, argues the case for cans thusly: "Can be hermetically sealed with a high degree of integrity, will maintain seal through lengthy storage period. Provides high degree of physical protection for particulate items (pieces of sliced meats, for example) which may

THAYER C. TAYLOR
Associate Editor, "Food Engineering"

Where's the Market for Freeze-Drieds?

A high degree of interest surrounds potential outlets of freeze-drieds because of the general conviction that each specific market will dictate the packaging requirements for those items. Thus, cans may go over well in the institutional market, while retail stores may favor pouches and bag-in-box setups.

Cost factor, it is assumed, will tend to aim freeze-drieds at special markets where a premium price can help packers recoup R&D expenses. Examples are United Fruit's freeze-dried shrimp, where the frozen version has long been considered a luxury item, and Armour's Star Lite line, which gives campers an alternative to heavy canned foods.

Since many see freeze-drieds following in the paths staked out by dehydrated items (which take just under 2% of the consumer's food bill), the experience of Vacu-Dry Corp., said to be the largest producer of low-moisture fruit products in the country, may be enlightening. That company's sales break down as follows: 15% to food processors (Corn Products, Duncan Hines, General Foods, Pepperidge Farms, Pillsbury, Quaker Oats); 30% to military; 32% to institutions; 4% to exports; and 19% to jobbers, wholesalers.

Some of the markets already staked out by producers of freeze-drieds represent impressive potentials. For example, Americans spend more than $500 million a year on soups—of which 92% is said to go for condensed versions, 6% for dehydrated mixes, and 2% for frozens. And the campers market is placed at 20 million individuals by the Interior Dept. These campers spent $50 million on food in '59, American Can estimates.

Institutional and export markets shape up as good bets for freeze-drieds, too. Some 25 billion meals a year are served up by the institutional market, one researcher estimates. This is broken down among 16 billion in commercial outlets (restaurants, cafeterias, hotels, railroad diners), 9 billion in noncommercial locations (schools, hospitals, prisons, factories, armed forces).

And freeze-drieds' weight-savings and elimination of refrigeration make them feasible for shipments to overseas markets where low temperature facilities are absent both in distribution channels and in the home.

Additional specialty markets include: Boy and Girl Scouts, whose needs are similar to those of campers; work crews (such as oil well drillers, lumberjacks, survey teams) who are located in out of the way places; survival kits, where weight and space are important factors in stock-piling; and roadside luncheonettes with limited storage space.

become crushed or powdery if subjected to physical force. Can be filled and closed under vacuum at relatively high operating speeds."

At least three packers here use cans to ship their freeze-drieds. United Fruit & Food Corp. (formerly Liana) markets freeze-dried shrimp to the institutional and industrial trades in No. 10 cans holding 13½ oz. of product, packed in an inert gas. Meat packer Wilson nitrogen gas-packs 5-gal. cans. And Lipton distributes its industrial soup mixes containing freezer-dried chicken and mushrooms in tins. Furthermore, FMC Corp., which ships freeze-dried vegetables to processors in poly bags enclosed in 50-lb. fibre drums, uses cans for smaller batches.

Overseas, Irish Sugar uses 44-gal. corrugated steel drums, packed under a nitrogen atmosphere, for bulk export sales.

As against this, there's a widespread feeling—shared even by American Can and Continental Can—that the can's weight will limit its appeal for freeze-drieds. Also, that the more brittle items may rattle around in the tins, thus break down into a powdery form.

United Fruit is said to have reduced this hazard by packing its freeze-dried shrimp as tight as possible. Then, too, it is pointed out, this may not be too much of a problem where the freeze-dried is to be mixed with other ingredients for such combination products as stews or casseroles.

Significantly, the introduction of thinner, lighter tinplate and the aluminum can suggest that the metal container may find a place where rigid support is a critical need.

To get around the weight problem, R&D work is concentrating on flexible film laminates. Aluminum foil is considered an essential element here because of its imperviousness to moisture and oxygen. But foil's tendency to develop pinholes, and inability to seal easily, makes it necessary to wed it with other materials that overcome these defects.

Aiming for the right combination, the military's Food & Container Institute has checked over fifty materials as well as various 2- and 3-ply combinations. Best container they have come up with (which gives the product a 2-yr. shelf life) is one comprising heat-sealable 3-mil vinyl, 1/3-mil foil, and ½ mil polyester. However, food makers say this is too expensive for commercial use, so they're looking for cheaper combinations.

Thus Armour's Star Lite line of meat entrees for the outdoor market is packed in a nitrogen-flushed pouch that uses saran-coated cellophane laminated to foil. To guard against pinholes, the foil is coated on both sides with 2-mil polyethylene (which also aids sealing).

As an additional protection against crushing, the pouches are placed in sulfited paperboard cartons. Combination meals are packed two to a box, single meals one to a carton.

Wilson, too, is experimenting with different multi-ply pouches, including a cello/foil unit that has a double extrusion coating of poly. Contending that a 100% leakproof pouch may be far off, the packer warns that **processors will have to set up rigid packaging controls in order to live with far-from-perfect flexibles.**

Another processor who is experimenting with flexibles concedes that there are product protection problems but insists "they're not insurmountable." And, he goes on, "there are today many combination materials that will give shelf life of up to a year."

Of course, as Fred Reiter of duPont de Nemours' film laboratory, points out, **"An item's turnover rate influences how much extra product protection you have to build into a package."** Another researcher cites dehydrated soup mixes as learning "to live with leakers because the product is a fast shelf-mover and is consumed shortly after it is brought into the home."

Protection in Reverse

Safeguarding the product against package defects is only half the problem connected with flexibles. Sometimes, container

has to be strong enough to resist puncturing by the product—such as spear-like meat slices. This problem has been the subject of a series of tests by Canada's Defense Research Medical Lab.

J. B. Hulse, head of the group's food research section, states that tests have shown that "laminates are superior but not perfect in that strength of combined materials was not sufficient to prevent punctures by hardened gristle and gelatin." Among the possible solutions studied by the Canadians, according to Hulse:

"Paperboard sleeves or cartons to separate meat from barrier material. These have the disadvantage of added weight and bulk, and tend to absorb fats unless specially treated. Developments of more laminates and use of a cushioning layer are possibilities, although certain cellular materials collapse when compressed. Top and bottom pulp board sheets were an improvement, but still had punctures. Telescoping cartons gave much better results. Combinations such as cellulose acetate/foil/vinyl and polyester/foil/MW pliofilm were also unsatisfactory unless used in conjunction with a carton protector."

Marathon's R. T. Shockley points out that there are about 2,000 different combinations that suppliers can work up for food processors' needs. He reasons that food industry will first have to figure out the protective setup it wants. Then, he adds, suppliers can look into the properties of the various materials and work up the best combination — from protection and cost angles.

He feels, though, that the final package will be "a pretty sophisticated affair." Materials will be laminated by one of two ways, he notes: 1) Extrusion, such as laminating foil to cello by extruded poly; or 2) adhesion, such as nitrocellulose solvent types used to link foil to paper, or polyester to coated cello.

Along this line, Dow Chemical says its most promising prospect is 300 M-type cello/½-mil poly/1-mil foil/2-mil poly unit. And Milprint is working on a cello/foil/poly pack that has plastic extruded to the outside cello and to both sides of the foil. Both firms say their entries are highly impermeable to gas and have an extremely low MVT rate.

While flexibles and cans dominate the picture up to now, no one rules out the possibility of an in-between package turning the trick. Ekco-Alcoa, for one, is pushing a semi-rigid, full curl, vinyl-coated container that, it claims, can be hermetically sealed. Closure is affected by a die-cut, vinyl-coated foil cover that is sealed over the container's smooth rim. Work is under way to adapt it to vacuum packaging.

If this proves out, it would brighten the prospects of rigid foil trays, considered by some to be an ideal medium for packaging freeze-drieds. Inability to take a hermetic seal has held back this container's use for freeze-drieds.

DuPont's Reiter sees the possibility of something on the order of a carton being engineered for the freeze-drieds. Here, container parts would act as tension cushions for larger fragile items.

And Canco's Lueck points to the use of an in-package dessicant "to reduce the moisture content below that attained in the dehydration process for some foods that are very sensitive to enzymatic activity." A typical example, he notes, is freeze-dried orange juice.

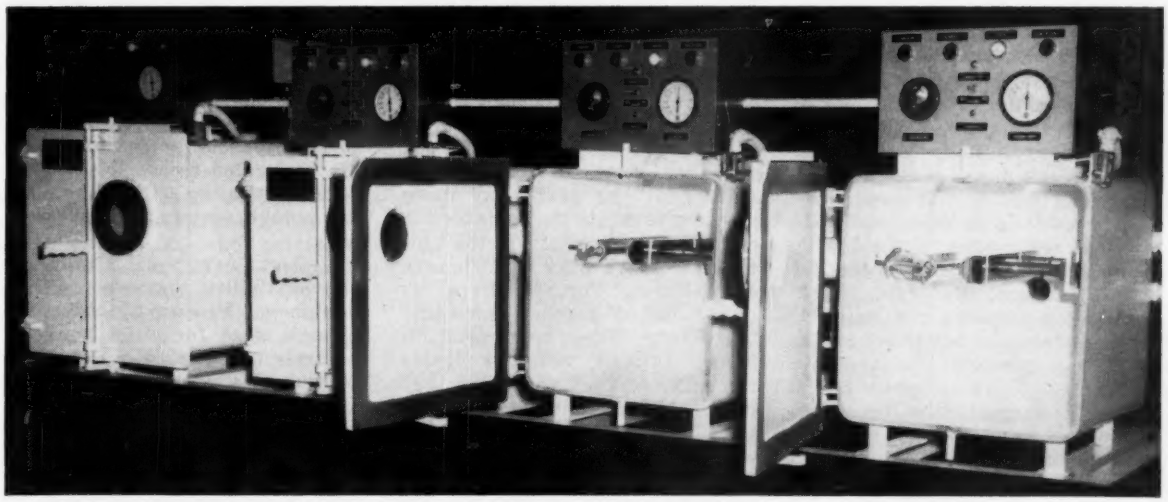
Then, too, he predicts, "There are signs that up coming coatings, materials, and sealing compounds may eliminate the need for laminations." One example is Celanese Corp.'s new "Celon" which reportedly has the strength of steel yet can be used as a flexible material to take the place of pouches.

In Europe, interest is centered on a bag-in-box type setup where a plastic inner liner (for protection against water vapor and oxygen) adheres to a paperboard sleeve or carton (for rigidity and graphic design). Also, tetrahedron shaped containers, like those tested for packing sterile milk, are looked upon as possibilities.

Filling the Package

Because of the speed with which freeze-drieds suck up moisture, plus the danger of oxidation, **packaging operations have to be carried out in a controlled low humidity environment.** Food & Container Institute specifies 30% relative humidity for items like orange juice crystals and a maximum 50% RH for meats, cabbage, and other vegetables.

However, others urge an even



HARDWARE FOR PACKING freeze-drieds: Vacuum-nitrogen gas packaging system, designed by Vacudyne to handle preformed pouches, consists of four vacuum chambers. Line is being used for various meat and vegetable items. Cycle takes 30 sec.

lower RH level. Says R. H. Lueck, "Packaging should be carried out in an air-conditioned room with the RH held below 20%." And F. H. Lindstrom, vice president, Vacudyne Corp., cautions that "35% is the maximum, but the lower the better."

One meat packer would like to maintain 10% RH in his packaging room but concedes that, costwise, it is impractical. He tries to keep the room at a maximum 25% RH.

Furthermore, all agree that finished items must be packaged as fast as possible—within an hour at tops. Lindstrom feels that if products are packed within an hour's time "there is no appreciable moisture pick-up."

To keep the finished product from rehydrating, it's likely that some filling lines will be reengineered. Two possible innovations are suggested by duPont's Reiter. One, for web-type units, involves closing off the filling and sealing stations with plexiglass or lucite paneling and flushing the air-tight area with nitrogen. A second method, for pouch-type form-fill-seal machines, would be to insert a tube into the filling mandrel and pump nitrogen up through the product as it descends to the waiting pouch.

Presently, most of the packaging of freeze-drieds is a hand-pack operation using preformed pouches. That's because of the limited volume needs.

However, as volume picks up and puts the emphasis on faster filling speeds, steps are being taken to modify equipment used to pack luncheon meats and sliced cheese, for example, to handle the freeze-drieds. While speed is nowhere near can or glass lines, 60- to 100-min. rates are not considered impossible.

Food & Container Institute has embarked on a study to find out (1) what equipment is needed, (2) what modifications are required for present equipment, and (3) what, if any, new equipment will be called for. According to the institute's Frank Rubinate, most available equipment can be used for freeze-drieds, but sliced items may be a problem just as they have been for boil-in-bag processors. He suggests that items like ground beef and cabbage can use present machinery if they can be hooked up with vacuumizing and/or gas-purging attachments.

Some new packing equipment is being styled for freeze-drieds. Typical is a vacuum-nitrogen gas packaging system developed by Vacudyne which is being used by Van Brode Milling on meats and vegetables. A batch process setup, it works with preformed pouches.

System consists of 4 side by side vacuum chambers individually able to handle pouches from 2 x 2 x 2 in. up to larger sizes at a rate of 8 packs/min. Each chamber has a control panel for cycling operations and heat-sealing jaws.

Cycle starts when operators feed filled pouches into each chamber. Then, in order, a vacuum is pulled, nitrogen is purged and reevacuated (to make sure there is no residual product-damaging oxygen), nitrogen is repurged, package is heat sealed, and the vacuum is partially broken. Whole sequence takes about 30 sec.

Some of the more fragile or brittle items may require modifications in existing pouch equipment because of their tendency to powderize when **dropped** into a package. Looked for is a unit that will **"slide"** or gently **lay down** freeze-drieds into the container. A step in this direction is the new Rotoflex pouch filler of Delamere & Williams, Toronto. Here, as open-mouthed pouches move into the rotary filling area, product-loaded funnels telescope inside the sack. As they withdraw, they deposit loads gradually from bottom up.

Once food makers move beyond the hand-packing stage, they hope to reach speeds of between 100 and 150/min. (common for some conventionally dehydrated items). Vickers-Armstrong Ltd., of England, says it can provide equipment which will fill at 120/min.

V-A's system begins with a carton-forming unit that utilizes a plastic inner liner. Liner material is fed from a roll and heat-sealed to folding cartons, which then proceed with open-top ends to the filler. After product is deposited, cartons are vibrated to "firm down" the item. At the sealing station, filled cartons are inserted into individual chambers where a high vacuum is drawn. After the container has been filled with an inert gas, the inner liner is sealed. The cartons are glued and closed after they leave the chamber.

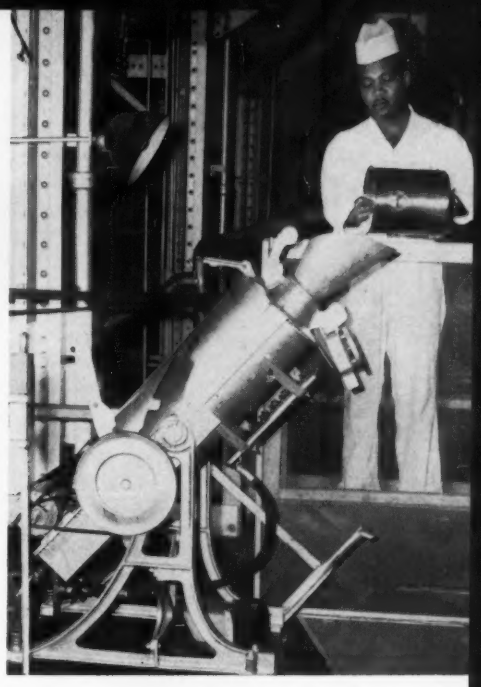
Company says the line can be engineered for either free flowing (peas) or portion pack (beef steak) products.

Additional bag-in-box machine units for freeze-drieds are offered by Cekatainer, Sweden; Hermetet, West Germany; and Atlas, Denmark. Danish outfit is developing a new automatic filler, called Inpresso, for cup- or worm-dosing of accelerated freeze-drieds. Gassing and sealing will be done under a high vacuum, a spokesman says.

Vickers - Armstrong also raises the **possibility that when filling equipment becomes advanced enough, need for strict humidity controls in the packing area will be less of a problem**—except for very hygroscopic items. However, the company warns, it will still be essential to store freeze-drieds under controlled conditions (probably a dehumidified nitrogen atmosphere) while they are awaiting packaging. (End)

Food Firms Marketing Freeze-Drieds

COMPANY	PRODUCT	MARKET
Armour	Meats, stews, meals	Military, Outdoor, Mail Order
Bernard Foods	Freeze-drieds in stews	Outdoor, Mail Order
Campbell	Freeze-drieds in soup mixes	Retail
Corn Products	Freeze-drieds in soup mixes	Retail
Irish Sugar	Meats, fish, vegetables, fruits	Export
Lipton	Freeze-drieds in soup mixes	Retail, Institutional
Puccinelli Packing	Vegetables	Export
Reliable Packing	Meats	Military
United Fruit	Shrimp, chicken Vegetables	Institutional, Industrial Military
Van Brode Milling	Meats, vegetables	Military
Wilson	Meats	Military



PUFFING - GUN produces vegetable pieces with porous structure for much quicker final drying.

USDA Process Produces 'Quick-Cook' Dehydrated Foods

Puffing-gun halves final drying time of vegetables that rehydrate rapidly. Technique can apply to other foods

HERE'S SOMETHING quite new in dehydrated foods—vegetable pieces that will need only about 5 min. simmering to make them ready to eat.

A new process that eliminates most of the 15-30 min. usually required to rehydrate such pieces is now being applied experimentally to carrots and potatoes by U. S. Department of Agriculture engineers. The process should not only work for many other vegetables, but for some fruits and perhaps other foods as well.

Just as consumers of these products should appreciate the shorter cooking time, processors should appreciate the quicker dehydration made possible by this new method. The first 40-50% of the moisture in such foods is relatively easy and economical to remove. The new process gets rid of this readily removable water by conventional drying methods. Then it subjects the partially dried pieces to a gradual increase in pressure, followed by sudden release of the pressure.

"Shot-Gun" Technique

This is done by the familiar "shot-from-guns" technique long used in making breakfast cereals. When they come from the puffing gun, the vegetable pieces have a porous structure, so that they can be dried to the desired moisture content in much less time than is usually required. The quicker drying also makes it possible to process much larger pieces than can be handled in conventional drying.

Experimental pilot-plant operation of the process thus far has produced some excellent dehydrated carrot and potato pieces. However, developers of the process say it is not yet ready commercially. They are not quite satisfied, for example, that they have found the optimum times or temperatures of drying. They also hope that the cost of puffing will be offset by the reduced final drying time. It will take additional research to establish this. Further, tests must be performed to determine product shelf life.

In the experimental operation, diced carrots are blanched and diced potatoes are precooked in 160F water. This precooking gelatinizes the starch and greatly improves the texture of processed potato products.

A rod-reel washer removes the under-sized pieces. These are initially dried to a moisture content of 30-50% in a tray on belt-trough drier. A continuous-belt or truck-and-tunnel drier could also be used. The pieces are then placed in a cereal-type puffing "gun." Essentially a sealed chamber, the gun is heated from without to bring the pressure to 30-60 p.s.i.g. Then the chamber is opened instantly, and the sudden pressure change vaporizes some of the superheated water in all parts of the vegetable pieces to give them a porous structure. The pieces are returned to the drier in this porous form which greatly facilitates their final dehydration.

More Development Planned

Still to be established is the relationship between the moisture content of the partially dried piece and the pressure that should be built up in the puffing gun. With carrots, satisfactory preliminary results have been obtained by first drying to 50% moisture, heating in the gun to a 30 p.s.i.g. pressure before ejecting, and drying finally to 5% moisture. Potato dice have been first dried to 45%, "instantized" at about 40 p.s.i.g., and dried finally to about 6-7% moisture. Indications are that puffing can cut final drying time in half.

Engineering details are being worked out in an effort to develop a commercially feasible process. More cost and storage data are being accumulated, and experiments are under way to determine the applicability of the process to other vegetables and fruits.

Process is under development by Roderick K. Eskew, James Cording, Jr., Nelson H. Eisenhardt, and John F. Sullivan, USDA chemical engineers of the Agricultural Research Service's Eastern Utilization Research and Development Division, near Philadelphia.

NORMAN E. ROBERTS
U.S.D.A., Agricultural Research Service, Philadelphia, Pa.

PULL-TAB aluminum can, two to a paperboard carton, protects new dry soup mixes flavorwise and physically. Product is gas packed.

Campbell Creates Dry Soup Line

Freeze-dries some ingredients in new plant. Packages in pull-tab aluminum can to protect quality. Seen supplementing canned soups

OUT of Campbell Soup's extensive research and development program has come another dividend. The progressive Camden food processor has created a new quality line of seven Red Kettle dry soup mixes packaged in aluminum cans. This achievement involves progress in freeze drying, innovations in packaging, and a multi-million dollar equipment installation.

The soup varieties produced as dry mixes are popular items whose ingredients are well suited to dehydration. They include: Chicken noodle with diced chicken meat, beef noodle, cream of chicken, cream of mushroom, cream of potato, onion, and noodle with real chicken stock. More varieties likely will be introduced later, according to President W. B. Murphy. A tomato item may be among them.

FE Staff

Before launching the line, Campbell consumer-tested the soups in 2,000 homes. It supplied the same products in cans and in envelopes. The can won the preference score.

Pricewise the new dry mixes are competitive with canned soups on a perserving basis. Two cans sell for 39¢, except for plain noodle—two for 29¢. Each can makes 24 oz. of soup (noodle, 32 oz.).

In preparing the ingredients, freeze drying is used to reduce the moisture content of beef, chicken, mushrooms and some vegetables to 2 to 5%. But vacuum, spray, and air drying are used for other ingredients. Items with relatively low water content are best suited to the slow and relatively costly freeze-drying technique.

Biggest Freeze-Dry Plant

Freeze drying protects quality, involving the least flavor loss of any dehydration process. Campbell has

been researching it since the 30's when it was being applied to blood plasma. The firm has been pilot-planting the technique with foods for three years. What Mr. Murphy considers to be one of the larger commercial freeze drying plants is his new two-story and mezzanine installation in a Camden plant. The facilities for quick freezing prior to sublimation drying under vacuum are there, too.

Various makes of freeze dryers have been pilot operated by Campbell, and the firm has selected Stokes equipment for its soup plant. However, the firm desires continuous equipment and is doing engineering research in that direction.

End-point control in the soup freeze-drying process is on a time basis.

Packaging Advances

The rigid, hermetically sealed, enamel-lined, aluminum can protects flavor and physical condition of the ingredients. Inert gas replaces air in the can. Convenience comes with the Flavor-Seal container in the form of a pull-tab. This quickly and easily releases the lid by tearing a narrow prescored strip of metal from its rim.

Campbell selected the rigid container because the edges of dry noodles cannot make pinholes in it, because it prevents crushing of the fragile dry contents, and because it gives long shelf-life. According to Mr. Murphy, the cost is comparable to that of well-made laminated foil and plastic film envelopes used for dry soups by other firms. "Light as a feather," the metal can weighs only 12.253 grams, including the lid.

Two cans of soup are sold together in an end-loading paperboard carton with tuck-in closure, the carton being printed in the familiar Campbell red and white colors. The cans hold from about 1½ to 2 oz. and make 24 oz. of soup, or three to four servings (noodle makes five or six). A small folder with information about the soups, plus illustrated instructions for opening the can, is inserted into the carton. An aluminum-colored paper label wraps around each can.

Reuse values are seen for the empty container. Having a smooth rim, it can serve nicely as a baby cup or receptacle for various small household items, ranging from buttons to bolts.

Made by Central States Can Co. (see FE, Nov. '60, p. 46) from precoated stock, the cup-shaped can is produced efficiently on high-speed drawing machines. It has no side or bottom seams.

The cans do not dent easily and lend themselves to high stacking on pallets for efficient warehousing.

Working with equipment maker, Campbell developed special machinery to fill the cans. Two key requirements are accurate metering of ingredients and avoidance of excessive settling of the contents.

Supplements Canned

Being introduced market by market, the dry soups will reach national distribution over a period of several months. The higher the demand, the longer it will take. New York is considered a top market for dry soups.

Campbell's customary strong point-of-sale and advertising campaigns will tell consumers about the items.

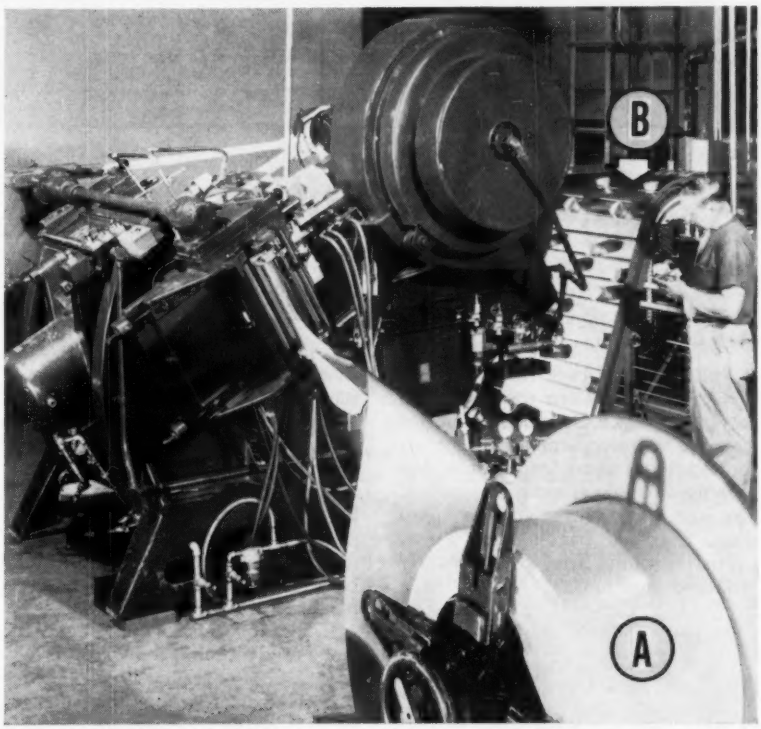
The company's aim in launching the line is to increase total soup consumption beyond the average one or two servings a week per person. And President Murphy believes that the dry soup mixes will do that by supplementing, not competing with, soups in cans. The dry mixes are expected to appeal particularly to foreign people in the U. S. or to those who have traveled in countries where dry mixes are popular, as in Western Europe.

More New Items Coming

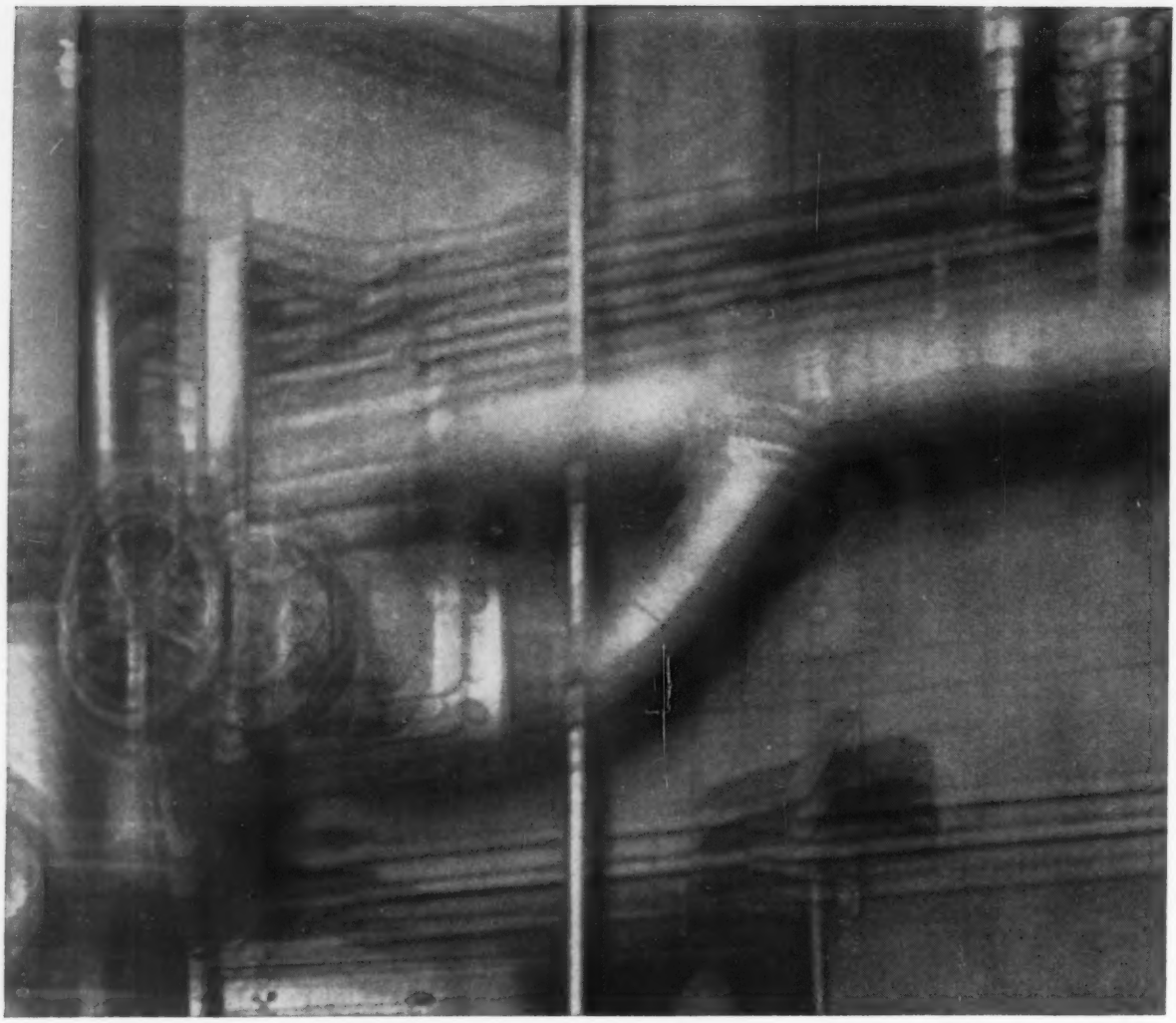
Mr. Murphy says that more freeze-dried foods may come out of Campbell. For instance, the firm is working on a freeze-dried egg. At present, the product is not good enough to market, yet is not bad, Mr. Murphy observes.

Soup bases for institutional sale will be introduced by Campbell. Two new condensed soups have been formulated and tested and are being introduced nationally. They are vegetable bean with beef (contains lentils) and chili-beef. Old-fashioned deep dish frozen pies will come out under the Swanson label, and beef stew in an 8-oz. can will go to the vending trade. There will be new Pepperidge Farm bakery items, too. The Pepperidge pan rolls introduced recently are swamping the company with orders.

In introducing new items, Campbell likes those that bring into play great skill at blending ingredients. (End)

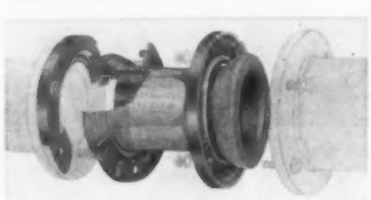


CANS ARE FORMED (B) as this press blanks and draws coil-fed coated aluminum sheet (A). Other machines redraw to final size, trim, and flange. Production is simple, fast.



Tranquilizers for pipes that shake like this

HERE's a sure cure for pipes that get rattled when the pressure's on. Install a B.F.Goodrich connector between the pipe and the pump. A connector is a short length of rubber hose used to join sections of pipeline. The soft, thick rubber absorbs vibrations. Cuts out banging and noise. Increases pump life, avoids costly broken connections.



In a midwest zinc plant, pipe on a hot acid line had to be replaced 2 or 3 times a year. Vibration from the pump shook the pipe until it banged, rattled, cracked. Then a short length of the lead pipe was replaced with a BFG Flexseal connector. Its cost $105. And it saved the customer $1000 in the first year alone by eliminating the cause of broken connections, frequent repairs, costly pipe replacements.

In addition to *Flexseal*, B.F.Goodrich has recently announced a new heavy-duty connector, called *Flexlock*, which is built to take working pressures up to 150 lbs. Both Flexseal and Flexlock are made with abrasion and acid-resisting rubber. Both provide full flow connections. Both can be ordered with or without wire reinforcement.

B.F.Goodrich distributors can give you complete details on B.F.Goodrich Flexseal and Flexlock connectors. And as factory-trained specialists in rubber products, they can answer your questions about any of the products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-186, Akron 18, Ohio.*

B.F.Goodrich

Tips to Management

Plea for management rights

. . . Canning safety . . .

Needed: 'Fourth Diploma'

Glidden Carries Management Ball

A plea by The Glidden Co. to the U. S. Supreme Court may have far-reaching effects on your firm's future labor dealings, especially regarding your right to close worn-out plants and facilities.

Case concerns a Court of Appeals decision that employees have "vested" seniority rights even though the contract under which they worked has expired, their employment has been terminated, and the subject was not a part of the bargaining contract in effect.

Controversy stems from Glidden's closing of a plant in Elmhurst, N. Y., in '57, and subsequent establishment of operations in Bethlehem, Pa. Firm offered jobs in Bethlehem to displaced employees, helped them find comparable employment in Elmhurst, and generally tried to alleviate the situation.

Despite this, five employees filed suit against Glidden, claiming that it was an implied condition of the agreement that seniority rights created by the contract would survive contract expiration. A New York District Court found in favor of Glidden, but the Court of Appeals reversed the decision.

Said Glidden Pres. Dwight P. Joyce at a press conference: "We hope that the Supreme Court will reverse this decision and give back, not only to Glidden, but to all American industry, the right to make decisions which are based on sound business practices and are in accord with its contractual and humane obligations."

Canning's Biggest Injury Hazard

Despite extensive industry use of mechanical handling equipment, one third of all accidents in the canning of fruits and vegetables occur in manual handling of non-food materials.

Recent Dept. of Labor report (BLS No. 183) points to containers such as fiber cartons, boxes and crates, and cans, as being by far the most prevalent source of injury associated with handling, although working surfaces and conveyors were also common sources.

Hazardous working conditions and unsafe acts were equally prominent among accidents analyzed. Back strains were largest single injury.

Cures for Committee-itis

Too many committees or not enough? Are they really useful or do they just slow things down? Who really makes top management decisions—committees or individual executives?

If you'd like to know what the next fellow thinks, take a look at a new AMA report (Top Management Committees: Research Study No. 48). It's a profile of 93 firms which maintain 319 management committees of all types. Report attempts to set forth conditions under which committees operate effectively and the fields of most likely committee success.

Study also provides information on how management committees are classified, how they operate, and the specific functions and authority with which they are invested.

Baking Exec Hits Training Complacency

"The continuing profitability of the baking industry depends on an all-out effort to upgrade management talent," according to Interstate Bakeries' management development chief, Dr. Charles A. Dailey.

Citing an attitude of complacency in the industry toward management development, he told an American Institute of Baking audience that management ability, skill in decision-making, human relations, and administration, is the "Fourth Diploma." "This," he emphasized, "is the one which has the most to do with company survival and profits."

As a checklist of development, he notes that an educated businessman:

- ► Knows what he's doing.
- ► Knows a good man when he sees him.
- ► Knows how both to agree and to disagree.
- ► Has the patience to read a book.
- ► Is neither scared by novelty—nor bored with it.

Hoffa Harbingers? Probably Not

First locals to quit the giant Teamsters since Jimmy Hoffa took over the helm include two food industry groups in Cincinnati—Soft Drink Drivers and Dairy Employees. Mixed with two other Cincinnati locals and a Chicago cab organization, these breaks have been looked upon by many as signs of wide-spread eruption within the Teamsters.

However, informed sources doubt the significance of these breaks as preliminaries to a real Hoffa disaster. Leading rebel spokesman for the Cincinnati locals expected to affiliate with the AFL-CIO, is James Luken, a long-time foe of Hoffa. As a Dairy Employee delegate to the Teamsters' Miami convention, Luken attacked Hoffa as a man without "clean hands" who had involved the union in "prosecution and persecution." This attitude left his future status in the IB of T limited, to say the least.

The Chicago cab local, the first to decertify, is felt by sources close to the situation as being a blast against discrimination rather than against Hoffa. Local boss had maintained an all-white executive council, although the majority of drivers are Negro.

Mechanizes Specialty Product Line

TAKE-HOME carton that boosted sales holds three caramel-coated and nut-topped apples within fluted cups.

Caramel coating and nut topping machine for "stick" apples does job better, faster. Effects big savings as Chicago firm's sales skyrocket tenfold

IT'S NOT EASY to mushroom a small business into a profitable one if you're producing a specialty item that involves much manual labor. And especially if one of your main operations makes help quit.

But Beatrice Caramel Apple Co. (Chicago) has developed an ingenious machine to do the job. It's a rotary unit for caramel coating and nut topping apples at speeds up to 85/min. It consists of ten spring-loaded pistons, attached to a vertical drive shaft at one end and to sticked apple-holding clutches at the other. In a sense, pistons replace workers' arms, and clutches their fingers.

In making one complete revolution, rail-riding pistons and their clutches travel from horizontal position (for apple feeding) to vertical (for caramel coating and spinning), back to horizontal (for nut chopping), again to horizontal and vertical (for discharging into tray). Cycle repeats as piston-chuck combinations return to horizontal feed position.

JOHN V. ZIEMBA, Senior Associate Editor, "Food Engineering," Chicago

Machine's Advantages

The new machine pays off with:

. . . **Increased output.** With new machine, output's about doubled —from 35-40 cases to 70-75/hr. (24 caramel-coated apples per case).

. . . **Less labor turnover.** Used to be that girls would only last about a week on the job. Reason is they'd burn their hands with hot caramel and, worse yet, blister their fingers while spinning sticked apple in caramel. Now, the machine automatically does the coating and spinning.

. . . **Less workers.** It takes only three girls to produce twice as much as it used to take five. Now, one girl injects sticks into apples, another feeds sticked apples to caramel coater and another packs them. Before, one operated the stick machine, while three coated and nut-topped apples that were packed by still another girl.

. . . **More apples coated from a batch of caramel.** With a 40-lb. batch of caramel, girls used to only coat 28-30 dozen of apples. Now, this same 40 lb. will cover 48 dozen. Reason is that temperature of caramel (200F.) is now more uniformly controlled in new machine's temperature-controlled, hot-water-jacketed caramel hopper. Because caramel's temperature doesn't fluctuate, candy's viscosity is more uniform. When temperature wasn't controlled, caramel often became so viscous that more was applied to apples. Moreover, girls' fingers developed blisters more frequently.

. . . **More uniform quality.** Caramel color is now more uniform. Keeping the caramel kettle over a gas flame used to sometimes darken the caramel's color.

. . . **Stepped up business volume.** Says Beatrice's president, Wm. Raimondi, "Installing three of these machines in our plant has increased our annual gross sales from about $25,000 to $250,000. What also helped our business was the development of a take-home window-type carton of three caramel apples that retails for 29¢ in supermarkets. However, we still maintain a good volume of

NEW CARAMEL COATER employs ten revolving spring-loaded piston-clutch assemblies. In sequence, stick end of apples are fed into opened clutch (1) as apples are carried past caramel coater and spinner (2) and then to nut-topping section (3) before they're discharged (4).

bulk-packed caramel apples—two dozen to a shipper."

How Operations Improved

Apple-sticking machine. First step in going semi-automatic was Beatrice's development of a machine for inserting into apples wooden sticks (15/64x7½ in.) pointed at one end. Sticks (400) are fed into a tapered-bottom hopper, from which they drop, one by one, through vertical guide bars. A revolving rubber wiper mounted on sprocket-drive assembly lines up sticks as they drop through guide bars. Girl operates foot peddle switch that start-stops motor which, in turn, actuates (through a pair of beveled gears) positive piston plunger. She feeds apples to machine as piston plunges sticks into apple core.

During sticking operation, girl grades apples for their second time. Company buys selected and graded (2¼ and 2½-in. dia.) apples. Regardless of apple's size, stick's plunged into core so that there's always 5 in. of it exposed. This way, there's no difficulty in packing caramel apples into take-home cartons.

This machine has also racked up some gains. For one, girls no longer have to hand-twist sticks into apples. Sticking's no longer off-center nor are holes too large. Either way, sticks are now firmly secured so that they're not separated from apples during caramel coating or nut topping.

Operation of new machine. Cast iron-protected pistons ride, as stated, over a 1-in. dia. rod that dips in two sections (caramel coating and discharge) so that spring-loaded pistons drop into vertical position as they make a complete revolution.

At start of operations, chucks ride over a chuck opening-closing bar (¼x1x15 in.). Bar engages and disengages spring-actuated trip. At this first stage (feeding), girl inserts stick end of apple into opened chuck to 1-in. depth to assure even coating of caramel. Depth's uniform because apple rests against a similar bar.

As traveling chuck drops off bar, trip is disengaged and apple is securely held. Piston-chuck assembly makes a one-quarter turn to second stage (caramel coating and spinning), drops 6 in. into vertical position to make contact with cam that releases piston's spring so that apple is plunged another 6 in. into gas-fired, water jacketed caramel hopper. Assembly then contacts 5-in. long V-belt that spins excess caramel off apple.

It then travels horizontally, making a second one-quarter turn on its way to the third stage (nut topping). Here, roasted peanuts, ground to ⅛-in. size are discharged onto revolving, stainless steel circular tray. Peanut grinder and tray are driven off machine's ¾-hp. motor, equipped with Reeves variable-speed drive.

Assembly again makes a one-quarter turn, drops into vertical position. Clutch's spring-loaded trip engages cam that opens clutch to release apple. Products are then placed in fluted cups and transferred to packing conveyor. (End)

Interesting Company Highlights

Beatrice's president, Wm. Raimondi, develops special machines for the food industry. His new caramel coater's available to the industry. He's already sold one machine to Gamble-Robinson Co., Minneapolis.

Raimondi's not satisfied with his present caramel coating operation, feels that labor costs can be further reduced by simplifying production. That's why he's developing a machine to abolish the stick-inserting operation. His prototype unit is now taking whole apples (without sticks) and, in straightline fashion, applying caramel and nut pieces to them. He plans on separately wrapping sticks (so consumer can insert them) and packing them together with caramel apples.

Another of his new machines molds and oven bakes a substitute potato jacket out of potato starch slurry. Baked jackets are automatically ejected from molds and fed to filler that deposits cooked, whipped potatoes into them. Product's designed to pass through toasting oven (to brown surface of whipped potatoes prior to freezing).

Old laborious and time-consuming method of preparing frozen baked potatoes involved manual cutting out jackets. And this involved, too, a lot of waste. Not only that, the labor-saving features of automatic peeling machines couldn't be adopted (as they are now).

Beatrice has also come up with another specialty product—frozen, chocolate-coated bananas (without skin). Like caramel-coated apples, this product also contains a stick. It's packed 24 to a shipper or three to a take-home carton (retails for 29¢, too). Since bananas vary in length, they're cut into pieces and patched to uniform lengths. They're also coated with powdered sugar to prevent surface browning after peeling and up to the time they're frozen.

Always on the Defensive?

Prepare Right Now for

Here's how one food firm takes the initiative in setting the stage for union contract negotiations. Eight key steps highlight continuing program to achieve company objectives

EVERY COMPANY negotiator is familiar with "the switch"—the time when you stop bargaining from the union's demands and start bargaining from your own. Unfortunately, this timing is often too late.

In our approach, evolved out of a considerable number of years of bitter experience and lots of thought, we pull this switch just once—right now—and keep it pulled.

Bargaining preparations should be developed in a way designed to make certain that the company gets maximum benefit from its wage dollars. Long range objectives for controlling the cost and economic effectiveness of its work should be the cornerstone of all company bargaining activity.

It makes sense to eliminate unplanned expenditures, to reduce the opportunities for encroachment on management's rights, to provide for stable relationships, and to make only planned increases in costs. To do this, we must plan ahead and develop positive, realistic collective bargaining objectives which clearly fit the needs and opportunities of our individual businesses.

Standard Pattern Prevails

But to most companies, preparation for collective bargaining follows a fairly standard pattern, designed primarily as a defensive counter to union demands. Management rarely takes the initiative at contract time with their own demands for contract changes.

E. R. NIEHAUS
Employee Relations Director, Great Western Sugar Co., Denver, Colo.

Does this mean that most companies are satisfied with existing contracts? No, it means that management hopes that this year the union won't open. Feeling is "if the company opens, the union will beat us out of more than we might have to pay if we wait to see their demands."

According to the National Industrial Conference Board, which has conducted surveys on bargaining preparation techniques, many devices are in use. Usually, most information is gathered into a bargaining book which contains some or all of the following:

1. Anticipated union demands deduced from actual experience under the old contract, area and industry patterns, etc.
2. Company position.
3. Arguments, pro and con, on company position and anticipated union demands.
4. Cost and/or other economic factors.
5. Legal obligations, if any.

Another arrangement suggests:

1. Present contract language.
2. Union proposed change.
3. Company proposed change.
4. Arguments, pro and con.
5. Cost.
6. Effect of changes in practice, if any.

'Wait and See' Strategy Hurts

These arrangements are often combined and can be tailor-made to your firm's requirements. They'll provide an excellent record for administrative follow-up after agreement is reached and ready-made preparation for the next contract re-opening.

Such standard techniques are effective and widely used; we use them in our company. But something is missing—initiative. This approach to collective bargaining is too defensive.

It waits to see what the other side is going to do. It leaves the field of strategic and tactical maneuver to the union. It gives the union a freedom of action and approach that is equaled nowhere else in the field of economic controversy.

Collective Bargaining

Management, by the very nature of its preparation, is on the defensive. Their objectives are bound to be "hold-the-line" by nature. Result is that over and over again, year in and year out, management places itself in the impossible position of agreeing to do that which it has said again and again at the bargaining table that it is unwise and unsound to do.

Impact of this conduct on the minds of union and non-union workers within a company gives substance to the union claim that, "it knows better what the company can do." After being told that a given union objective is out of the question from an economic standpoint, and then see this same unsound policy later adopted as a "cornerstone of our employee relations program," one wonders what the average employee must think.

And when the contract is re-opened, what is employee reaction? It's rank and file support for more.

There are several very logical reasons why the pattern of bargaining has put management on the defensive. For instance, the basic relationships between employees and unions, as established by law, place a company on the defensive. Then, too, this situation is the result of wishful thinking on the part of management. Companies seem to thrive on the hope that this business of wage and/or fringe benefit increases will come to a halt. But the fact is that wage increases in most industries began to assume "pattern" dimensions in the thirties and have continued to date with only a momentary slowdown due to economic controls during WW II and Korea.

Pattern increases in '60, the latest recession year, were from 8 to 12¢/hr with many higher and fewer lower. And the outlook for '61 indicates another "national pattern" of about 9¢/hr. While the profit squeeze may dampen some of labor's enthusiasm for forced settlements at higher levels, no signs indicate that labor's leaders are headed for the showers—at the bargaining table, in politics, or in the broad socio-economic area. As a matter of fact, many employees of unions — economists, statisticians, lawyers, political scientists, public relations and communications experts—are at work right now planning policies for 3, 5, and 10 years from now.

These long-established patterns of conducting collective bargaining are hard to break. Fear is that breaking a precedent will cause an upheaval in attitudes of union employees which will have expensive repercussions. Though the unions don't seem to worry too much if they decide upon innovations, management may be trapped by its own timidity and limited too much by habit.

Offers Positive Action Program

Our particular program appears to offer some hope of a more positive approach to this collective bargaining problem. We do feel we are "off the dime." Certainly, if used realistically, and in addition to the regular preparatory procedures, it can result in better preparation and, in some instances, might even restore the initiative to management.

Let's assume that your bargaining sessions have just been completed. Using our approach, you should then consider the following eight areas:

1. Define overall company objectives

Most managements do a lot of soul-searching about where they hope to be next year, three, five, and ten years from now. Goals are determined from the point of view of market potential, sales projections, raw material sources, modernization and replacement of capital goods, manpower requirements, money requirements, etc. Within this framework, there should be developed a well thought out labor relations program geared to and coordinated with other company plans at every point of contact and influence.

But if this kind of thinking is to be productive, it involves some realistic short and long term labor cost forecasts which are based on a factual analysis of what you honestly believe you'll have to pay. Stress must be put on the kind of contract clauses management must have if it is to achieve its goals.

This effort often results in the establishment of more sensible labor relations objectives and answers to questions like: Where do you want the level of wages to fall during the next contract, three years from now, five years from now? What contract provisions do you now have which will prevent or inhibit you from reaching these projected objectives?

Test the soundness of these objectives. Don't be

misled or unduly influenced by union wage or contract patterns, or by what others in your industry may be doing. Extent to which you do is the extent to which you practice past failures.

2. Measure results against objectives

Past experience has been that problems posed by union negotiations are put aside like the proverbial hot potato once agreement is reached. That, however, is the time for action.

Before memories grow short and material is lost or mislaid, hold a critique. Re-examine how well you achieved your objectives in the specific terms of the new agreement. Put them in perspective now and set out your program of collective bargaining objectives for the next contract negotiations with long term company goals in mind. Don't hide your head in the sand; you know the union is going to ask for more and get something.

In the light of over-all company objectives, determine how much you are going to spend, where you are going to spend it, and what you are going to get for it in the form of contract modifications which will facilitate your control of your operations.

3. Investigate internal relationships

For this type of planning to be effective, all company personnel resources must be geared to the accomplishment of labor relations objectives. It will help not only to achieve these goals, but will also provide a good feed-back of information to help you evaluate the soundness of your labor relations policies.

Find out, at all points of contact, how the provisions of the union agreement, including union wage rates, affects the non-union operations and non-union personnel of your organization. Find the areas of conflict, misunderstanding, apprehension with sales personnel, traffic, purchasing, accounting, engineering, and research. What modifications need to be made?

4. Evaluate present contract operation

Ask first line supervision for a full scale breakdown on actual operation of the agreement. Put particular emphasis on those clauses which the foreman thinks interfere with his freedom to exercise proper managerial control in areas of work flow, task assignment, transfer, lay-off, recall, penalties, etc.

At the same time, you can also do a careful and comprehensive job of educating supervision. Steps can be taken to make certain that all of your supervisors have a clear understanding of the company's objectives.

Reality demands that any objective which receives consistent supervisor rejection should be withdrawn, modified or, if after review is still deemed essential, a full scale educational effort should be laid on to bring supervisors into agreement.

5. Set up collective bargaining objectives

This should contain only those things which are genuinely needed to implement your company's short and long term objectives—and no more. It should involve a realistic economic appraisal of what you believe is right considering the level of economic activity in your business—not someone else's.

It should not be done defensively. It should not take into consideration at all any known or anticipated union goals or objectives. And it should not contain a single proposal that you are willing to give up for the sake of an agreement.

Your program may have to be evolved on a step-by-step basis. This is particularly true of contract language changes affecting work rules, seniority and various functions which you may need to restore to management. These changes have to be done a little at a time. Set up a priority schedule on contract language changes based on your original establishment and projection of company goals. Set out in draft form the kind of a contract you would like to have.

Formulation of well thought out bargaining objectives will illustrate the need, if any, for special investigations, job studies, activity analysis, or other needed information which should be provided between now and agreement termination.

6. Set up administrative procedures

These should be made consistent with company objectives, particularly with respect to vague or generalized clauses and contract provisions. Carefully conceived administrative pressure on these points can result in favorable changes in practice. But this technique requires thoroughly prepared first line supervisors who identify themselves and their jobs with the objectives you seek to achieve.

If warranted, general economic and other educational and informational programs should be developed and applied. This is not just a part of preparation for collective bargaining; neither is it a technique applicable only to employee relations. It is a necessary and vital adjunct to over-all company planning.

7. Check objectives against trends

About a month or so before contract time, procedures and developments to date should be reviewed. Present economic trends and union patterns should be measured against company objectives to test their realism.

By this time, you should have received the union's demands for contract changes. If you have done a good preparation job, these demands won't upset your plans too much. Your strategy is already defined and the union demands pose a tactical problem which can now be met with a positive program of your own.

8. Prepare for actual negotiations

You are now ready to prepare in the usual manner, but have been thinking far enough in advance of contract termination to set in motion a number of important activities designed to support you at the bargaining table. You have set the stage with tighter over-all understanding by supervisory and non-union personnel of company aims, education, orientation, and training. And you will have completed any special studies which may be needed to back up proposals made by you at the bargaining table.

Planning—Courage—Tenacity

In measuring the results of collective bargaining, words and phrases in the union agreement are generally more costly than money. It is not "business realism" to allow unions to encroach on management's right to manage nor to write into the union agreement contract clauses which undermine the economic stability of our businesses.

To avoid this situation, we need long range planning, the courage to set clear-cut company goals, and the tenacity at the bargaining table to insist upon their accomplishment. (End)

PURITY 69

FROM BABY FOODS TO FROZEN PIES...

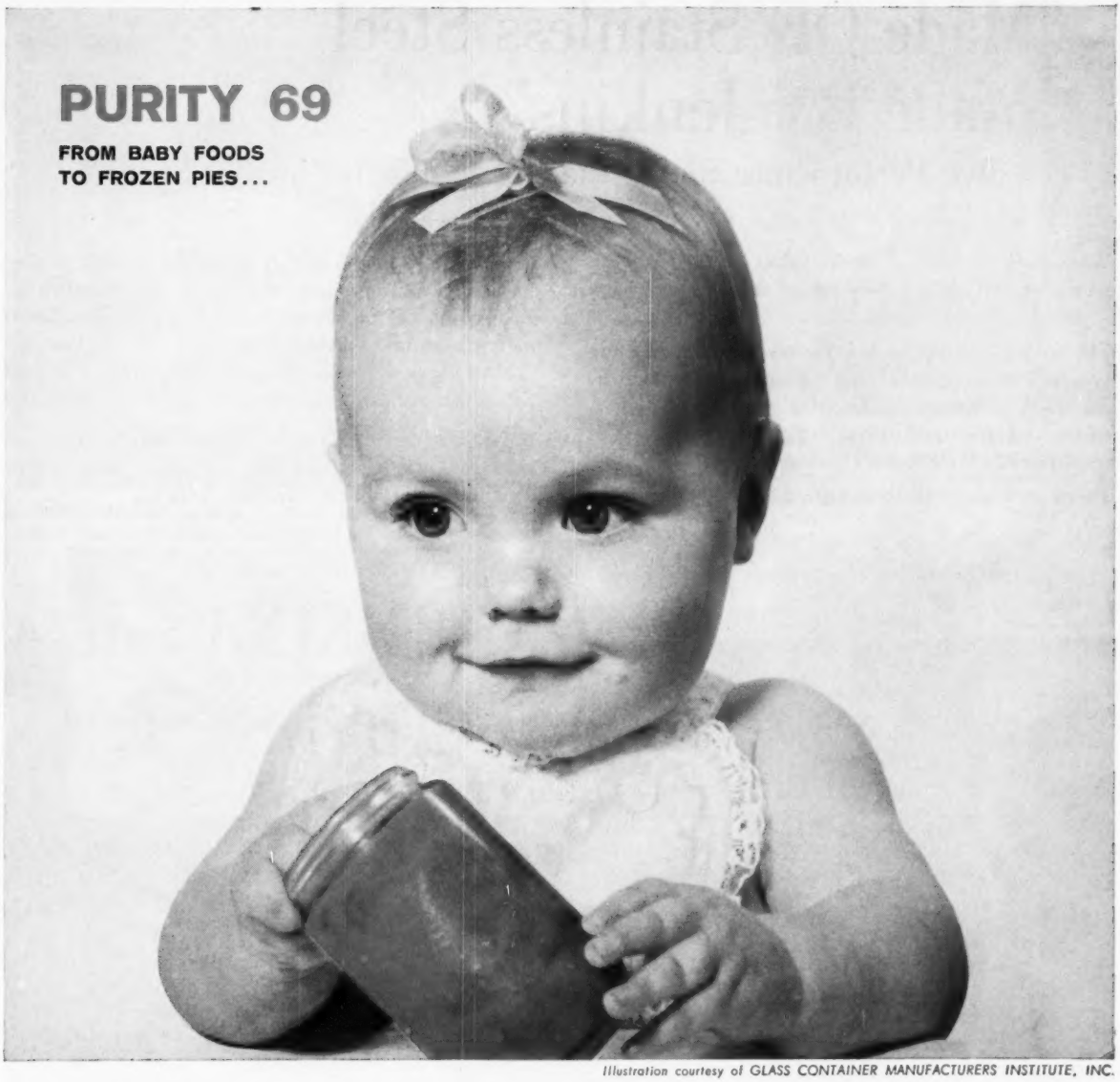


Illustration courtesy of GLASS CONTAINER MANUFACTURERS INSTITUTE, INC.

"FRESH FOOD LOOK" after months of storage

PURITY 69 prolongs storage and shelf life far beyond normal requirements! Stabilizes fruit fillings over a year at refrigerator temperatures while other specialties break down after a week or two. Withstands as many as 40 freeze-thaw cycles while other specialties weep and cause texture changes after two to five "freeze-thaws".

PURITY 69 also offers superb gourmet qualities in taste, texture and clarity. A simple taste-color comparison shows the difference.

PURITY 69 should be evaluated wherever smooth heavy-bodied texture, lack of cereal taste and exceptional shelf-life are desired. Suggested for all types of frozen specialties, canned and jarred foods, canned pie fillings, fruit desserts. Write for information.

National STARCHES

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"Made OF Stainless Steel ...Made BY Jenkins"

Valve Performance Shows the Big Difference in that Spec!

When service conditions require valves of Stainless Steel, remember that metal is only part of the answer to long, dependable valve performance.

The WAY valves are made is equally important. Factors you can't even see make a big difference. Such factors as *perfection of castings . . . precision machining . . . painstaking inspection and testing . . . sound design.* Most important of all: *the maker's guiding policy about quality.*

To be sure about all these critical factors, experienced specifiers and buyers specify JENKINS as well as the metal alloy when Stainless Steel valves are needed. It is well-known that for almost a century Jenkins has made valves to *just one* standard of quality . . . the highest. At Jenkins every operation, every worker is aimed at fulfilling that standard, whatever metal a valve is made of.

SEND FOR NEW CATALOG 59-SS of Jenkins Stainless Steel valves in types and alloys to satisfy most needs. Jenkins Bros., 100 Park Ave., New York 17.

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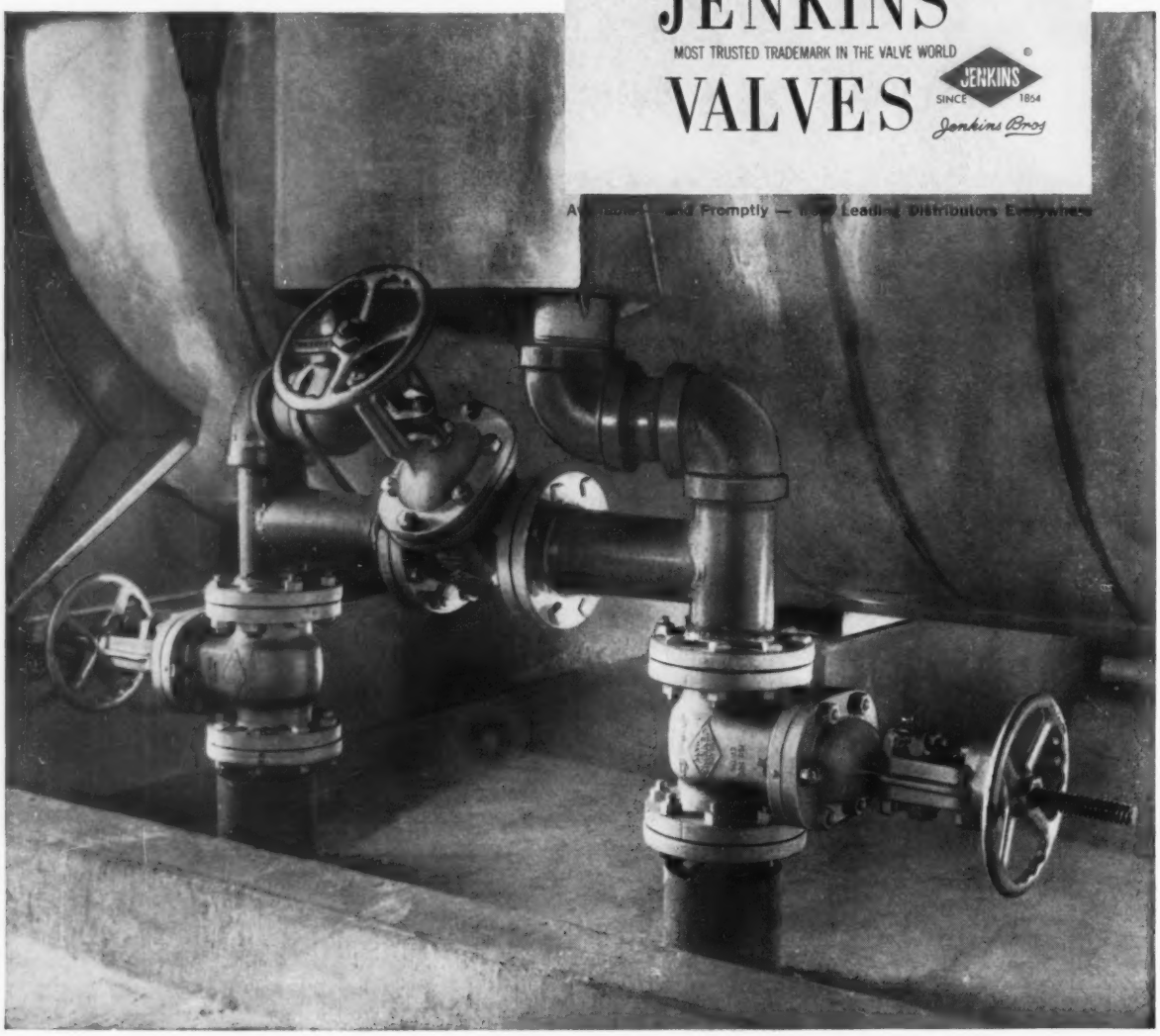
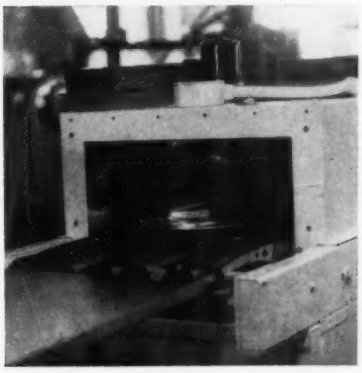
VALVES



BENEFIT-PACKED package features black bottom foil pan that distributes heat evenly, plus extra strong, inexpensive biaxially oriented poly that serves as cover.

AS FOIL PAN travels on start-stop conveyor, roll-fed poly is cut to sheet form, then drawn over container by moving fan.



IN SHRINK TUNNEL, pan and film are pulled up into sealing chamber, where fan-driven hot air shrink-seals poly to foil at up to 45/min. rate.

Mates New Materials for Better Package

Black bottom foil pan and irradiated poly cover solve soggy crust problem for baker

PAIRING a black-bottom foil pan with a shrink-type film closure has hypoed sales and snuffed out consumer complaints for Ken Rose Products, Bangor, Mich. According to Ken Matheis, president of the pizza firm, the packaging combination has eliminated the soggy crust problem that plagues all pizza makers.

Container is a 9-in. round pan of .0045-gage foil with full curl rim construction (Ekco-Alcoa). It's used in conjunction with an irradiated, shrink-type, biaxially oriented polyethylene (Cryovac Type L) that serves as a combination overwrap and transparent lid (FE, April '60, p. 56).

Heat-absorbent black coating, spotted on outside of pan's bottom, provides even heat distribution to all parts of the pizza simultaneously. As a result, crusts now are more flaky and have a uniform brown bottom, says Matheis. He contends that consumer tests have shown that pizzas take less time to bake in the "black bottoms," taste more flavorful.

FE Staff

Irradiated poly, treated by a high-energy electron source, has five times the strength of conventional film, is able to more than double-stretch in two directions. After the film is wrap-sealed over the container, it's shrunk as much as 50% to conform to product's shape.

Other Benefits

Foil-film combination is popular with supermarket operators, too, claims Matheis. It increases product's shelf life over conventional pizza package. Previously, the product was packed with a coated paperboard backing, overwrapped with printed, heat-sealable cellophane or poly. Thanks to the rigid foil and the stronger poly, new unit stands up better to rough handling, and doesn't fog up in freezer cabinets, Matheis affirms.

Consumer gains in other ways, he notes. For one thing, pizza can be baked and served in same package without the use of cookie-type baking sheet. For another, Cryovac cover is easily replaced on container for leftover storage.

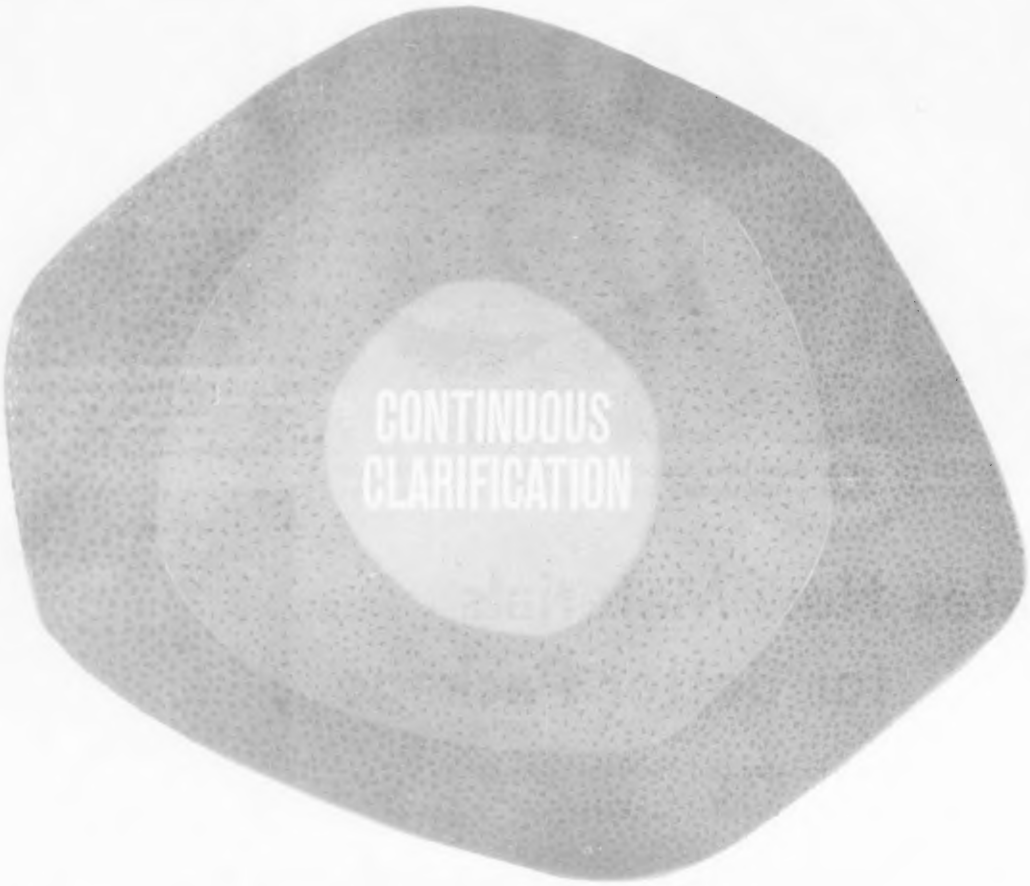
Costs? Foil unit runs to about 6¢—about ½¢ over the previous one. And the film adds another ½¢.

Before switching from cello to poly, Matheis tried using a foil pan with deeper vertical flange and a printed polystyrene lid. Although plastic cover offered transparency and suitable product protection, the package cost came to 7¢. Packaging costs can be a critical item in the hotly competitive pizza field where 9-in. pies retail for 69¢.

Trend Grows

Other food firms are beginning to take to the "black bottoms." Arnold Bakers, Port Chester, N. Y., is using them for buttered tea rolls. And Chet's Famous Foods, Eugene, Ore., employs them for frozen pot pies.

Ekco-Alcoa sees the film-foil container catching on with frozen food specialties like TV dinners and entrees. Meat packers are said to be looking the package over for heat-and-eat items. (End)



THE BIG SWING IS TO "BIG SAM"

It started with citrus processing...then prune and grape juice...wines...soluble coffee and tea...sugar solutions... protein extracts...now the Big Swing to "Big Sam" is reaching into every branch of the food industry. If old-fashioned, space- and time-consuming batch methods have put a damper on profits, it will pay you to check centrifugal processing with WESTFALIA's "Big Sam"— for fully automatic, around-the-clock, high capacity operation... "Big Sam" means Big Profits.

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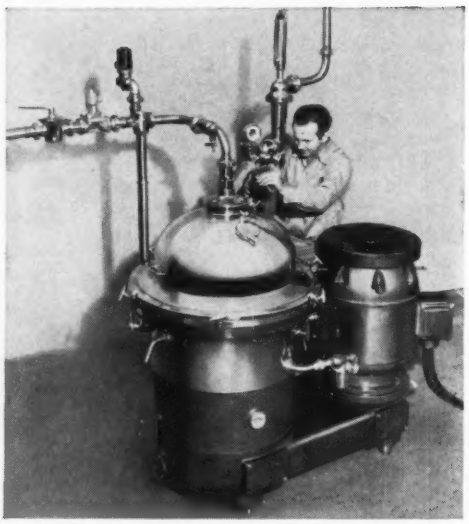


Used to control pulp solids concentration in orange juice, "Big Sam" Automatic De-Sludger in all-sanitary design (Model SAMN-15037) has found wide acceptance in Florida citrus industry. Similar installation is part of unique orange juice processing system developed by Minute Maid Company now in operation at Minute Maid's Plymouth and Leesburg, Fla. plants.

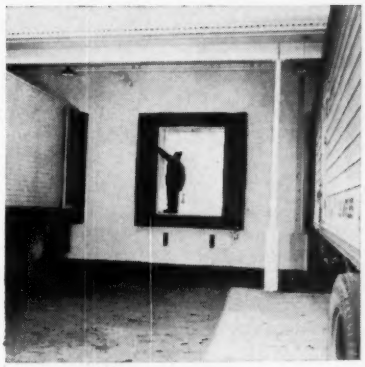
Practical Ideas

Converts Seasonal Packs To Year-Round Operation

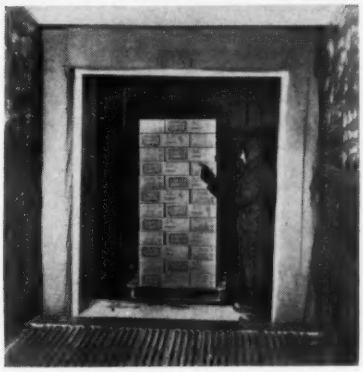
By adding French-fried potatoes to its line of frozen vegetables, Libby, McNeill & Libby has reduced the peaks and valleys in what was a highly seasonal packing operation. Thus, the company now makes more efficient use of plant facilities, and its employees have better job security.

Libby packs frozen vegetables, other than potatoes, from June to September. Then it processes and packages French-fries from October through March.

All the vegetables, except potatoes, are processed and frozen at top speed during harvest. They are stored in bulk bins for subsequent packing during less hectic periods. Potatoes, however, are well suited to off-season packing because they can be stored for many months.—*FE Staff.*



FOR "ZERO LOADING" of refrigerated trucks at Carnation Co., dock doors are surrounded with airtight seals.



BACKED AGAINST THE SEAL, van forms a continuous cold chamber with plant's below-zero room.

Truck-Loading System Conforms to AFDOUS Code

Here's how Carnation Co. assures its motor carriers and customers that its frozen pies are delivered at below-zero temperatures from the company's Torrance, Calif., plant.

The simple, but effective, device is a "zero-loading" facility. As shown, a foam-rubber seal surrounds the dock doors of the plant's "cold room," forming an air-tight compartment when standard refrigerated vans are backed against the rubber seal.

This, in effect, converts the van's interior and the plant's "sharp" room into one continuous area. Loading and unloading of frozen foods and frozen ingredients are now accomplished with no loss of below-zero air, even in hot weather. The facility, which conforms to the AFDOUS Code, can handle four vans at a time.

V-Belt Maintenance

The processor who doesn't get 2-3 yr. of good service from his V-belts is not getting his money's worth.

Once the belt is properly applied, it's up to you to see that it's maintained properly. Here are some checkpoints:

1. Belts should ride upright in sheaves. Misaligned sheaves can cause them to turn over.

2. Worn sheave grooves create differential driving, i.e., one belt may pull more of the load than the other. Broken sheave flanges tear up the belt sides and cause excessive wear.

3. Slack off on the center distance when installing new belts. Running or prying belts on may cause permanent damage by rupturing covers and load-carrying members.

4. Install belts under proper tension and recheck belt tension periodically, tightening if necessary. Refer to manufacturer's bulletin for method of checking proper tension. Horsepower transmitted depends on total tension which, if not properly maintained, causes belts to slip, flop, or vibrate excessively.

5. Belt guards prevent foreign matter from falling onto belts or into sheaves. Provide ample clearance so that belts do not snag or drag on the guard. Also provide for easy removal of guards so that belt tension can be readily checked.

6. Do not allow belts to run turned over. The drive may still operate, but will only bring about early failure.

7. Do not use belts from different manufacturers on the same drive because their physical characteristics generally will differ.

8. Do not set up a drive with 'long' belts. If at initial installation 80% or more of the take-up is used, ask for a shorter length.

9. Do not install one or two new belts into a set of old or used ones. Replace the entire set if one or two belts fail or are damaged. The remaining good 'used' belts can be saved and matched into a set with other 'used' belts. Suppliers generally have belt-matching machines and can do this for you.—*A. W. Spicer, Head of V-Belt Field Engineering, B. F. Goodrich Industrial Products Co., Akron, Ohio.*

(Continued on page 60)

ELECTRIC INFRARED PROCESSING EQUIPMENT ALLOWS MANUFACTURERS TO COUNTDOWN TO A NEW MINIMUM TIME REQUIREMENT IN MANY INDUSTRIAL HEATING APPLICATIONS

The Fostoria Infrared process is partly responsible for the quality built into the products you see here. Its speed breaks bottlenecks in production techniques. Its flexibility allows adjustment to new conditions with a minimum of effort. Its versatility provides economies unheard of in convection heating equipment. If you use heat in your manufacturing process, make a note to check with Fostoria about how to improve product quality with this time-saving, money-saving, labor-saving electric infrared equipment.

For temperature requirements under 900° F. send for folder "Applications Unlimited."

For temperature requirements from 900° to 3000° F. send for "Breakthrough" folder.

COUNT DOWN

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MANUFACTURERS OF ENGINEERED RADIANT ENERGY EQUIPMENT AND CRITICAL WORK AREA LIGHTING

CIRCLE 60 ON INQUIRY CARD

Conveyor Side Guards Simplify Cleanup

T-shaped guards installed along our conveyors enable easier, quicker cleaning.

The white conveyor belting, of greaseproof Neoprene, carries potato chips from fryers to packaging machines. The stainless-steel guards, 4-in. high, were made in our machine shop. They are secured to the angle-iron supporting the belt by spring-mounted roll pins fitted into slots.

It takes less than a minute to remove each 6-ft section for end-of-the-day cleaning. And guards are just as easily mounted into position.—*N. C. Rasmussen, Plant Manager, Hiland Potato Chip Co., Des Moines, Ia.*

Simplifies Tank Hookup

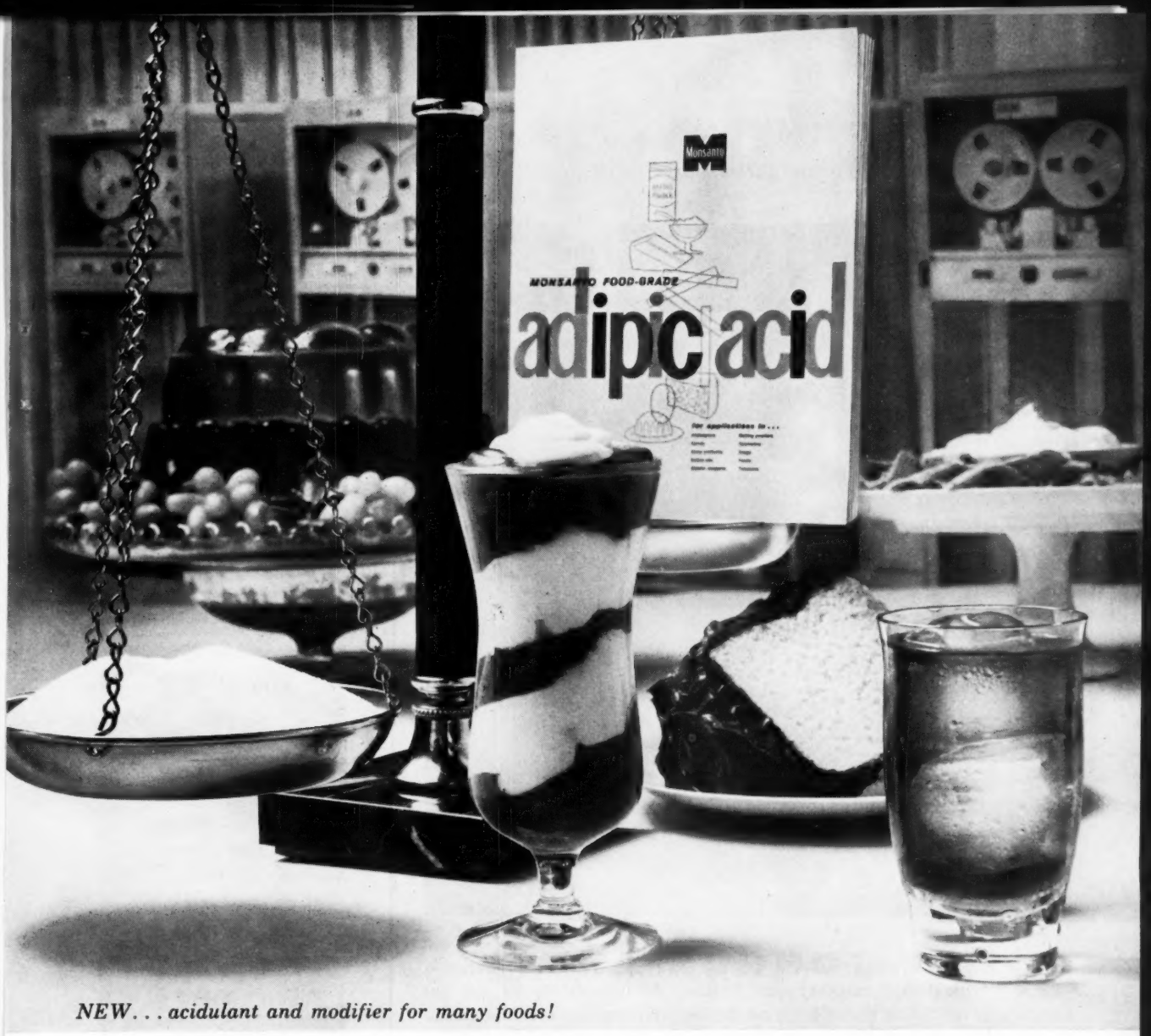
Available with 2-, 3-, or 4-in. grooved or threaded connections, this unit eliminates reducing to match tank connections. Its cross-type body design replaces the usually required pipe tee.

Called P. V. Tank Valve, it is available from *Instruments, Inc., P. O. Box 556, Tulsa, Okla.*

Seen boosting production on packaging lines at General Mills' Buffalo cereal plant is an ingenious control devised by two of the company's maintenance engineers. Employing an electric eye, it permits continuous operation of a package maker, but starts and stops carton and liner feed according to requirements for carton supply to the scales.

To minimize freeze damage to lettuce during rail shipment, USDA recommends that initial salting of ice be delayed until the first re-icing station.

CIRCLE 61 ON INQUIRY CARD ➔



NEW... acidulant and modifier for many foods!

How *Food-Grade* Adipic Acid* can tantalize the palate (and tickle the treasurer)

Monsanto *Food-Grade* Adipic Acid — *FDA-approved!* — promises you money-saving advantages unmatched by any other food acidulant. It performs better than citric or tartaric in a *host* of applications.

Check this partial "can-do" list: Add lemony tartness to desserts, beverages, candies. Make smoother spreads, creamier dips. "Uncurdle" puddings. Pinpoint pH control as never before.

And, check this! Lets you relax!—*Nonhygroscopic* Monsanto *Food-Grade* Adipic Acid safeguards the shelf life of your mixes and powdered concentrates.

Uses galore! Benign buffering agent. Tenacious foam stabilizer. Flavor exciter. Fantastic "texturizer." (And cost-cutting possibilities go along with every one of these uses!)

Skeptical? Well, sir, just get the facts and run a sample through your test kitchen. Then step ahead of your competition with a better product!

**Pure white Monsanto* Food-Grade *Adipic Acid, granulated to unvarying mesh characteristics, is so stable it doesn't decompose even in the molten state. And, of course, you can store it* indefinitely.

MONSANTO CHEMICAL COMPANY
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St. Louis 66, Missouri

Monsanto

Please rush ☐ my copy of the technical booklet "Monsanto Food-Grade Adipic Acid" and ☐ send me a sample for testing.

*Name*_____ *Title*_____

*Company*_____

*Street*_____

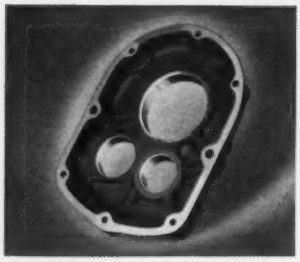
*City*_____ *Zone*_____ *State*_____

...the quality-engineered package

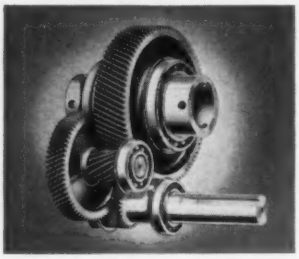
that simplifies speed reduction

DODGE TORQUE-ARM, America's most widely used shaft mounted speed reducer, will save money for *you.* No foundation, no sliding motor base, no flexible coupling, no installation fuss. Developed and perfected by Dodge, this reducer has been so widely accepted in industry that it is now built and stocked in this unmatched range of sizes and models: capacities up to 170 hp; output speeds from 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; speed ratios up to 175 to 1 with correct selection of speed reducer and V-belt drive. Built-in backstop available. Also positive overload release. Vertical models. Flange mounted models. Special application models . . . Go modern—go Torque-Arm! See your Dodge Distributor, or write us.

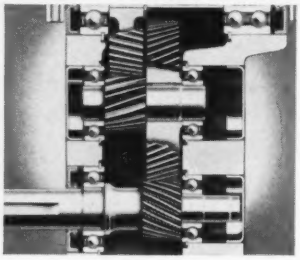
Dodge Manufacturing Corporation, 2800 Union St., Mishawaka, Ind.



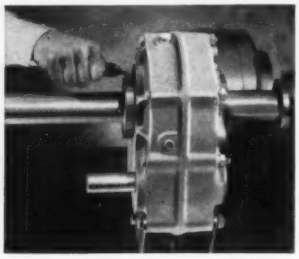
Rugged, semisteel housing holds bearing seats in line for entire life of unit. Laughs at loads. Corrosion resistant.



AGMA rated helical gears. Soft cores withstand shock; hardened surfaces defy wear. Teeth are crown shaved.



Gears are located *between* bearings and carry their loads without strain. Longer life, higher efficiency.



Unit slides completely onto shaft and locks on *both* sides of housing. This baby stays *put*—runs truer longer.

The Products with the Pluses... **DODGE** ***of Mishawaka, Ind.***

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

Doing It Better

DAIRYLAND FOOD LABORATORIES

Automates Rennet Making

Time and labor saving automation is the key to top-efficient rennet production at Dairyland Food Laboratories, Waukesha, Wisconsin.

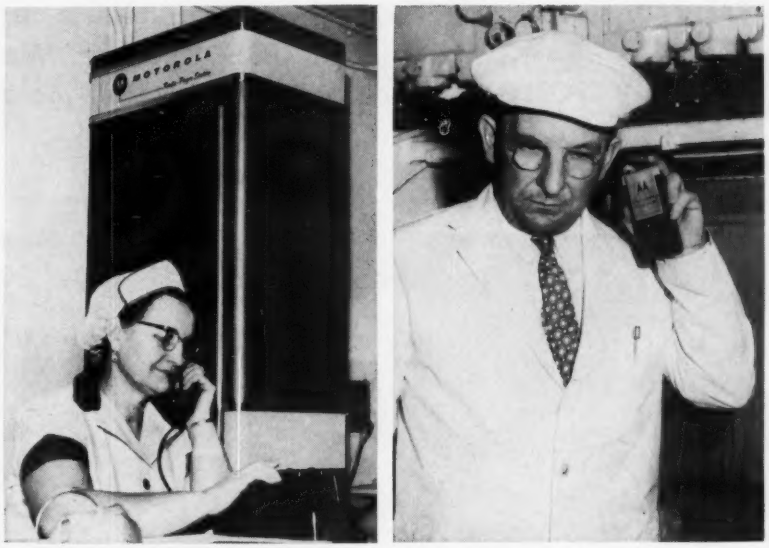
The new plant is equipped to process either flat salted or dry brown rennets under rigid electronic controls. Three sets of fiberglass tanks are used for extracting, finishing, and storing the rennet. Each processing tank has its own refrigerated jacket, which eliminates the need for refrigerated manufacturing areas. Tank interiors are completely seamless for ease of cleaning.

During extraction, pre-set controls automatically operate a pump and valve system which draws extraction solution on and off the rennets. Transferring brine from one tank to another is accomplished merely by turning a switch on a control panel. All piping, of corrosion-resistant plastic, is color coded for identification and adapted for in-place cleaning.

The fiberglass tanks are supplied by Fibetron Corp., Milwaukee. (203)

Oberto Sausage Co., Seattle, has upped production 50% by switching from string-tying to stapling of sausage rings. The labor-saving stapler used has automatic foot-action control, handles up to 125 lb. per hr. of product. Unit is made by Bostitch, E. Greenwich, R. I. (205)

Dawn Donut Co., Jackson, Mich., packs prepared mixes in a new multi-wall bag that provides a tight seal plus means for quickly and easily opening the bag. Latter is sealed by a tab that snaps loose from the bag seam with a gentle pull. Bag is thus opened completely or partially to form a pouring spout. Unit is supplied by Bemis Bro. Bag Co., St. Louis. **(206)**



BY DIALING a three-digit number, dispatcher (left) can send voice messages to supervisor (right) anywhere in plant.

H. J. HEINZ CO.

Speeds In-Plant Communication by Radio

Locating a key man on the move at H. J. Heinz Co.'s 16-block plant is quick and easy with their radio paging system.

The system enables making last minutes changes in production schedules, locating maintenance men needed on production lines, and contacting supervisors. Members of the factory managerial staff, maintenance men, and plant-protection personnel use the pagers 24-hr a day. The pagers merely change pockets between maintenance, cleanup, and production shifts.

Each of the 19 units is assigned a three-digit number. Calls to them are dialed on telephone-style desk sets in the factory maintenance shop and the plant protection office. As the pager called emits an alerting tone, the person carrying it pushes a button and the voice message comes through.

The system was installed by Motorola, Inc, Chicago. **(201)**

Vie-Del Grape Products Co., Fresno, Calif., lines its wine-storage tanks with stainless steel for efficient, long-range protection against corrosion. Welded in the field, the lining eliminates frequent repair and maintenance. It was applied by U. S. Steel's Consolidated Western Steel Div., Fresno, Calif. **(207)**

Refined Syrups & Sugars, Inc., Yonkers, N. Y., speeds tanker filling by warming syrups to about 90F. just prior to loading. Three compact heat exchangers, operating on 10-psi. exhaust steam, handle up to 500 gpm. of syrup. Shell-and-tube units were supplied by Patterson-Kelley Co., Inc., E. Stroudsburg, Pa. **(208)**

there's only ***one*** *company you can get* ***any*** *kind of metal conveyor belt from . . .*

USS Cyclone

It's true. USS Cyclone makes more kinds of metal conveyor belts than anyone else in the industry. Flexigrid, Flat wire or Woven wire, Cyclone will engineer it to fit your particular set of problems in your processing system. And then service it. We have 69 Cyclone Sales Offices across the country so you can get faster service from us than from anyone . . . no matter where you are. The next time you need a conveyor belt recommendation, call USS Cyclone. We're in the Yellow Pages under "Conveyor Belts—Metal."

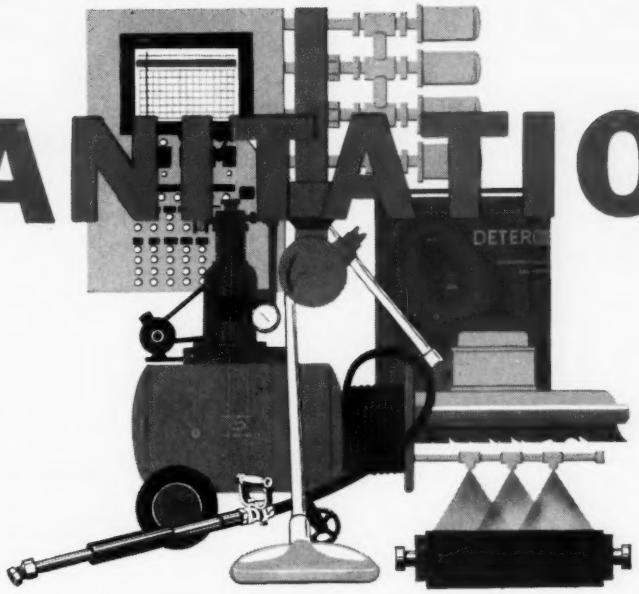
This is a new USS Cyclone Conveyall belt installed in the Brooklyn plant of Dietetic Foods, Inc. It's 18-8 Type 302 Stainless Steel, woven in a true ½" x ½" mesh to carry glass-packaged products through a 57-foot pasteurizer and cooler. According to Mr. Ronald Kalmore, Dietetic's vice president and general sales manager, "After looking over the field, Conveyall proved to be the closest approach to ideal equipment for us." Conveyall's short pitch combined with its particular mesh enables the belt to turn on substantially smaller feed and discharge rollers without developing a chordal action which could tip over jars with small-diameter bases. And the small rollers made it possible to eliminate "dead plates" at both ends of the unit which enabled Dietetic to use conveyor-to-conveyor transfer. This eliminated time lag between bottles and prevents direct glass-to-glass contact, drastically reducing breakage potential.

Steel This mark tells you a product is made of modern, dependable Steel.

USS **American Steel and Wire Division of United States Steel**

Cyclone Sales Offices Coast to Coast

SANITATION



Latest mechanized techniques are the key to your sanitation program's prime objectives—efficiency and economy

TODAY, you have at least two compelling reasons to mechanize your plant housekeeping for maximum efficiency.

First, your sanitation must be as near foolproof as modern equipment and techniques can make it. To settle for anything less is risky because food industry practices and regulations are making headlines as never before.

Whether such publicity does more to alarm consumers needlessly than to inform them is beside the point. The fact is that it has stimulated consumer interest in just about every phase of food production.

To their credit, most food processors maintain high sanitary standards. There are many good reasons—quality control, employee morale, pride, moral obligation, or perhaps just a common-sense desire to stay in business.

For the few who may need 'encouragement' to keep plants clean, regulatory authorities at every level now have expanded budgets with which to enforce strong laws. Specifically, FDA's '61 budget was almost 50% higher than that for '60. And the proposed figure for '62 is up some 25% in contrast to '61 budget.

FE Staff

So the real question is not how much sanitation you can afford, but how economically you can provide the best program for your plant. And any such program must include the services of a trained sanitarian, or it's likely to fall far short of the mark.

Second factor calling for increased mechanization is your steadily rising cost of labor. Admittedly, some sanitation tasks are largely manual operations. But many others can be done more economically and reliably by automatic or semi-automatic means.

We will detail these advanced techniques in the following pages.

In this report:

From FDA—Commissioner Larrick cites industry progress, stresses need for vigilance.

Equipment and Supplies—To help you do a better job at lower cost.

What Efficient Sanitation Costs—Comprehensive summary of charges at a National Biscuit Co. plant.

The Ideal Plant—How it might look and be equipped from the sanitation standpoint.

Latest Mechanized Systems—They cut sanitation costs, offer highest reliability.

Sanitary Equipment Design—It minimizes both your cleaning problems and costs.

Good Sanitation:

There's No Alternative

GEORGE P. LARRICK
Commissioner,
U. S. Food and Drug
Administration

In an exclusive to Food Engineering, FDA head spells out official sanitation policy, cites need for continuing progress and vigilance

AMERICAN food industry leadership has accepted plant sanitation as a part of the code by which it must live.

With today's emphasis on getting food additives and colors cleared for safety, however, additional emphasis on sanitation may be necessary to prevent losing ground already gained. There is even the possibility that manufacturers may think the Food and Drug Administration is less concerned with sanitation than it was a decade or so ago. This would be most unfortunate.

Sanitation as a part of the way of life of the food industry began in 1938 with the new Federal Food, Drug and Cosmetic Act. Perhaps many of the present generation of plant sanitarians do not realize that the law before 1938 did not contain this basic provision:

"A food is adulterated if it has been prepared, packed or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health."

This new provision of the law created its own industrial revolution. Progress in the food industry since 1938 has brought even higher standards of sanitation, just as it has brought the development of new products and the advancement of knowledge about testing additives for safety. And progress on all of these fronts has been an evolutionary process.

As we began enforcing the new law in 1940, we were concerned first with the sanitary quality of finished foods. Bakeries and candy plants were among the first to experience enforcement pressures.

The bakery and confectionery industries, through their trade associations, set examples that later became standard operating procedure for promoting voluntary compliance with the law. They worked out plant sanitation programs to be put into operation by their members. They encouraged every plant to make training for sanitation a definite part of top management's program. Sanitation schools were conducted. How-to-do-it posters and check lists were distributed by the thousands. And still are.

Later on, we were able to move the new sanitation concept back a step to suppliers of intermediate raw materials. Here again the trade associations played major roles in working out programs for their members. Millions of dollars were spent in renovating or replacing antiquated, uncleanable equipment.

Sometimes the going has been rough. The facts of life of marketing have had to be met in realistic, practical ways. And during a business recession, the sanitation program was for a time the first place some in management looked for a means of cutting operating expenses. The help of enlightened trade association leadership has been invaluable in 'selling' sanitation to industry as an essential and profitable operation—profitable not only in terms of public good will, but in terms of employee morale and efficiency of operation.

Room for Improvement

Sanitation is not to be regarded as a catering to the hypersensitivities of a squeamish public. Sanitation rules are firmly grounded in public health principles. Rats, mice, insects, dirty equipment, poor handwashing practices, high bacteria counts—where these are found, who would be willing to trust the remainder of the processing operation on the assumption that all of these sins would be forgiven by a final cooking?

There undoubtedly are some who would say we should now be satisfied with the status quo in sanitation. But in my view, when progress stops, stagnation and then deterioration will set in.

Moreover, we know that some of the newer industries have still to achieve what others would regard as minimum standards of sanitation.

In March of this year, we had to seek a court injunction to stop the manufacture of frozen breaded shrimp, breaded soft shell crab and other frozen seafoods under grossly unsanitary conditions which were clearly a threat to the public health.

And we know that some plants did again cut sanitation programs during the business recession of 1958 and 1959.

In summary, not every sanitation dragon has been slain; not every challenge met. The sanitation principles we have learned together in 20 years of experience under the law are merely the cornerstone upon which we should build.

For Better Sanitation

Seminars on frozen-food sanitation are the latest example of voluntary action by the food industry to keep its plants and products clean.

Sponsored by the National Assn. of Frozen Food Packers, the workshops offer processors a unique opportunity to exchange sanitation know-how. Two meetings have already been held in the East. Others are planned for the Mid-West and West Coast before the year's end.—**The Editors**

Tools for Efficient Sanitation

Equipment and supplies that save money, time, and effort

In-Place Cleaning Systems automatically control and record the cleansing of process equipment, storage tanks, pipelines, and tank trucks. Available as completely assembled packages, their controls and instrumentation can be integrated with automated batching systems.

Installed in single or multiple CIP circuits, the pushbutton cleaning units monitor the sequential circulation of water, detergents, and sanitizers. In general, the complete cleaning cycle consists of a pre-rinse, acid and/or alkali wash with intermediate rinse, final rinse, and sanitizing flush. Also automatically controlled are circulation rates and times, solution temperatures, and solution-tank levels. **(336)**

Circulating Parts Washers speed and simplify the cleansing of equipment parts, take-down piping, and fittings.

The out-of-place cleaning technique enables use of higher temperatures and solution concentrations that could be tolerated in manual operation. Moreover, the rectangular tanks employed can be equipped with 3-way valves to circulate solutions through CIP circuits, or to return them directly to the tank for parts cleaning only.

Tanks are available as stationary or portable units with high-velocity pumps and circulation systems specially designed for efficient cleaning action in all parts of the tank. Delicate or small parts are handled in wire-mesh baskets. Solution temperatures can be automatically controlled and recorded. **(337)**

Ultrasonic Cleaning Devices have proved particularly effective for intricate hard-to-clean small parts, such as filler valves and tubes, and nylon brushes.

Basically, systems consist of a solution tank, ultrasonic generator, and transducers. Parts are cleaned by a combination of mechanical and detergent actions after only a few seconds' immersion in the tank. A quick rinse and a dip in sanitizing solution complete the job. **(338)**

Spray Cleaning Assemblies, preferably permanently installed in process equipment and storage tanks, provide jet and detergent actions plus the complete coverage required for efficient sanitation.

Various types of spray heads and patterns are available to accommodate the particular geometry of surfaces to be cleaned. However, all spray units should be of sanitary design—suitable material of construction, easily disassembled for inspection and cleaning of spray heads, self-cleansing and completely self-draining. **(339)**

Tank-Truck Spray Units, suspended through manholes, offer rapid and reliable cleaning.

A recent development is a reversible hydraulic unit that is suspended only by its hose. Its rotating head directs two high-pressure jets in full-spherical horizontal and vertical paths. After the head has rotated in one direction, unit is reversed to rotate in the opposite direction. This permits jets to strike at a different angle, which provides a thorough cleaning pattern. **(340)**

Steam Cleaners quickly provide a steady stream of dry steam or balanced cleaning solution at the flip of a switch.

The gas- or oil-fired units are completely self-contained and fully automatic. Remote control at the gun enables delivery of up to several hundred gallons per hour of hot or cold solutions, and high-velocity rinsing. **(341)**

Rider-Type Power Sweepers handle large floor areas quickly and efficiently.

Units sweep wide swaths which can be further increased by incorporation of side brooms. Sweepers are easily maneuverable; pick up all types of dust, dirt, and debris; and have large, easily dumped refuse containers. **(342)**

Self-Propelled Floor Scrubbers spread cleaning solution, scrub, rinse, pick up water, and dry the floor in a single automatic operation. Easily maneuvered units have large solution and recovery tanks, also meter cleansers for economical operation. **(343)**

Waste-Disposal Units, of hammer-mill design, rapidly handle a variety of food wastes.

One hopper-fed unit is started simply by opening a water valve, and it stops when valve is closed. A screw-feeder prevents overloading regardless of amount of material fed to hopper. **(344)**

Heavy-Duty Vacuum Cleaners, portable or operated from central systems, speed cleaning of plant areas and equipment such as box cars. **(345)**

Electronic Dust Control offers sharp reduction in use of manual labor and cleaning supplies.

One system subjects pre-filtered air to high voltage, which shatters and ionizes dust particles to

SANITATION

prevent settling. Equipment consists of static generators and screens, each capable of handling 10,000 cfm. of air. Power consumption and pressure drop through screen are negligible. (346)

Insecticide Foggers, either portable units or special ceiling-rigged atomizers, permit efficient use of insecticide. (347)

Ultrasonic Rodent Control reportedly clears a building of rats in 72 hr.

Unit's high-frequency sound pressure causes rodents to flee. In so doing, they become vulnerable to conventional extermination devices. Sound patterns are not duplicated until long after the rodents' endurance limit. (348)

'Black-Light' Units offer continuous control of most flying insects.

Equipment consists of near-ultraviolet lamps and an electrified grid. Insects are attracted by the lamps and killed on contacting the grid. Power consumption is negligible and models are available for indoor and outdoor use, and to fit into windows and doors. (349)

Pest-Bird Control Methods include harassing flashes of light and use of poisonous solutions. (350)

Chlorinated Detergents clean and sanitize floors, walls, and equipment in one operation. Readily water-soluble, they may be applied by brush, spray, or CIP methods. (351)

Floor Cleaners combine solvent, alkali, and penetrating actions for efficient soil removal—particularly fatty deposits. (352)

Sanitizers curb growth of microorganisms in equipment and plant areas. A new material combines phosphoric acid with an anionic wetting agent for high residual bactericidal effect. (353)

Bottle-Washing Compounds offer efficient wetting and cleaning actions, plus foam control. Non-corrosive materials also curb streaking. (354)

New Cake-Form Insecticide quickly attracts flies, kills them on contact. Tablets are merely placed in troublesome areas. (355)

For more information, circle key numbers on Reader Inquiry Card, back of book

Sanitation Costs at National Biscuit Co.

Reflecting efficient plant housekeeping at one of the company's modern cracker bakeries is the following summary of hours of labor charged to various activities. This plant has a floor area of 303,165 sq. ft. and employs 635 people.

The first table summarizes annual unit costs of general functions. Immediately below is a breakdown of specific tasks. All data were taken from National Biscuit Co.'s standard labor-distribution form for this plant's 1960 performance.

ITEM	DAILY HOURS	HOURS PER YEAR	ANNUAL UNIT COST	AVERAGE PERFORMANCE
Floor maintenance	8	2,066	1.71¢/sq. ft.	57 hr./mo./ 1,000 sq. ft.
Floor cleaning	20	4,940	4.07¢/sq. ft.	136 hr./mo./100,000 sq. ft.
Structural cleaning	16	4,044	3.33¢/sq. ft.	111 hr./mo./100,000 sq. ft.
Pest control	2	526	0.43¢/sq. ft.	14 hr./mo./100,000 sq. ft.
Office cleaning	9+	2,348	60.00¢/sq. ft.	20 hr./mo./ 1,000 sq. ft.
Grounds maintenance	10	2,531	$422/acre	14 hr./mo./acre
General waste disposal	9	2,393	$9.62/employee	32 hr./mo./100 employees
Personnel facilities	44	11,132	$44.80/employee	

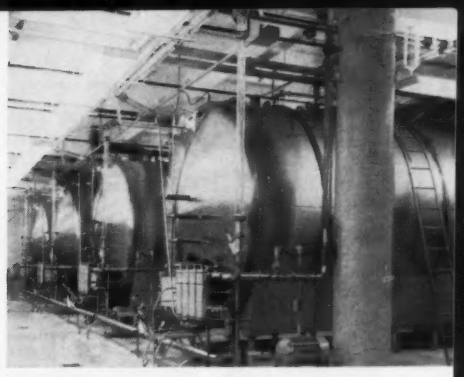
ITEM	DAILY HOURS	HOURS PER YEAR	ANNUAL UNIT COST
Maple floor sanding-edging	4	1,015	0.99¢/ft.*
Maple floor refinishing	1+	350	0.34¢/ft.
Concrete floor sealing	1+	356	0.35¢/ft.
Resilient floor coating	1+	378	0.37¢/ft.
Maple floor buffing	4+	1,089	1.06¢/ft.
Resilient floor cleaning	6+	1,621	21.40¢/ft.
Dry mopping, broom sweeping	11	2,726	2.25¢/ft.
Damp mopping	6+	1,627	1.34¢/ft.
Machine scrubbing	4+	1,050	0.87¢/ft.
Overhead cleaning	7	1,772	1.45¢/ft.
Light-fixture cleaning	1−	231	0.19¢/ft.
Wall cleaning	2+	592	0.49¢/ft.
Window, screen cleaning	5+	1,387	1.14¢/ft.
Structural painting	—	62	—
Flour equipment cleaning	1−	204	0.17¢/ft.
Insect control	1−	242	0.20¢/ft.
Rodent control	—	80	0.07¢/ft.
Toilets, lockers, lounges	19	4,747	$19.10/employee
Uniforms and laundry	16	4,037	$16.25/employee
In-place cleaning	—	23,774	*Area costs
Out-of-place cleaning	17−	4,379	in sq. ft.

ITEM	DAILY HOURS	HOURS PER YEAR
Mech. equipment cleaning	2	404
Ingredient tank cleaning	—	99
Stairway, elevator cleaning	3	770
Plant guarding	32	11,543
Stock room	4	1,000
Clerical	1	287
San. supervision (cl. time)	1−	206
Recorded plant inspection	1	255
Vacation & disability (paid)	—	2,680
Absentee (unpaid)	—	3,522
Relief and training	37	9,409
Warehouse	—	1,030
Assembly	3+	842
Mixing, makeup, cooking	8	1,983
Baking	35	8,843
Packing	33	8,449
Icing-cake	12	3,130
Cone, pretzel, wafer	9	2,329
Maintenance and repair	1+	360
Shipping, sales, garage	4	1,129
Cafeteria	11	2,887
Personnel, gen. services	2	500
Total	334	84,370
San. supervision (non-cl.)	30	7,503

From the sanitation standpoint:

The 'Ideal' Plant

Here are fundamentals of good industrial sanitation. They apply to all food plants, only the specific practices vary



TYPICAL of good sanitary design is Pepsi Cola Co.'s new pushbutton syrup plant. Tanks, piping, and fittings are of stainless steel. Overhead piping is glass. Entire system will be automatically cleaned in place.

ONLY A MYTHICAL PLANT could incorporate all of the sanitation equipment and techniques used in the food industry.

Yet the principles and many of the practices of good industrial sanitation are universally applicable. Here are some of the features of a food plant which might be considered "ideal" from the sanitation standpoint.

Management's Role

Sanitation at our ideal plant is effective primarily because it has management's active support. Sanitary maintenance of an entire plant and its equipment is not considered a "non-productive" subordinate function. It is efficiently organized and coordinated by a professional sanitarian. Moreover, sanitation personnel are intelligent, well trained, and enjoy a status that reflects the importance of the jobs they do.

Plans for the plant and its location were checked by a sanitarian to insure that they conformed to all requirements of regulatory authorities. At the same time, these agencies were consulted for valuable suggestions on sanitary building and equipment design, fire protection, and accident hazard.

The plant site is free of insect and rodent harborages. It also provides an adequate water supply and good facilities for waste disposal.

Plant Design

Rodent - proof construction, screening, and judicious use of insecticides are major barriers to infestation. Openings through which goods must enter and leave the plant are as few and small as possible. Air curtains or other insect-control devices protect these areas.

Roadways and dock areas are hard-surfaced and cleaned regularly of litter and debris. Particular attention is paid to disposal of garbage and liquid wastes to prevent them from becoming sources of infestation and contamination.

Inside the plant, walls and ceilings are of smooth construction and easily cleaned. There is liberal use of glazed tile or similarly impervious surfacings in process areas. Floors are of appropriately resistant construction, easily cleaned, and properly sloped to an adequate drain system where required. There are no false ceilings to harbor rodents, or dust-catching ledges and recesses.

A great aid to sanitation is proper lighting throughout the plant, which permits thorough cleaning and inspection. Good ventilation exhausts steam, fumes, and dust—especially in processing areas—for employee comfort and elimination of mold growth. Incoming air is filtered, and a positive air pressure inside the plant helps to keep out air-borne contamination.

Sanitation Operations

This plant is designed to make maximum use of mechanized sanitation procedures. Thus its equipment is of sanitary design and easily accessible for cleaning.

Where possible, process equipment and storage tanks are automatically cleaned and sanitized in place. Equipment parts are handled by mechanical washers. Tank trucks are cleaned by jet sprays.

Floors are kept sanitary by use of powered sweepers, scrubbervacs, and polishers. Although considerable manual cleaning remains, it is simplified by use of steam guns, vacuum cleaners, and special brushes.

Pest control is a continuous operation even in a clean plant. Good housekeeping practices, such as elimination of harborages and proper storage of materials, are important but cannot do the job alone. They are supplemented by insecticide-fogging, rodent trapping, fumigation, and regular inspection routines.

A well-equipped laboratory provides the sanitarian with facilities for physical and bacteriological testing. In-plant chlorination of process waters reduces the bacterial load on equipment and products.

Employee Hygiene

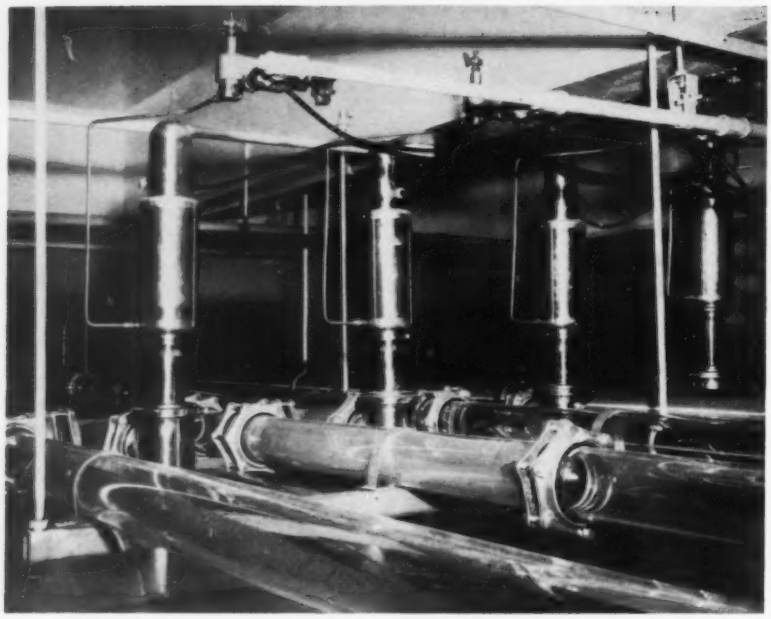
Since people can easily contaminate food by careless personal habits, management provides good washroom facilities and clean uniforms. Moreover, lavatories right in the processing area enables frequent washing of hands. Any employee who leaves the area must wash his hands before returning to his job.

Finally, management conducts a continual educational program designed to keep employees constantly aware of their responsibility in this matter.

You Can Get Help . . .

. . . with sanitation problems from any of the following sources:

1. **Local boards of health and other regulatory agencies.**
2. **Food-industry trade associations.**
3. **Professional consultants.**
4. **Suppliers.**
5. **Industry publications.**



AIR-OPERATED valves, such as these, are key components of pushbutton CIP systems. Actuated from a remote panel, they also monitor automatic batching of ingredients.

Mechanize Your Cleaning

Latest circulation and spray-cleaning techniques can do a better job at lower cost

COSTS GO DOWN when your cleaning of process and handling equipment is mechanized. Equally important, the labor-saving techniques employed also offer consistently good sanitation.

We certainly do not imply that all food equipment can be properly cleaned by mechanical means alone, or that your manual routines may not be reliable. In fact, many sanitation tasks will continue to be done manually—and at rising labor costs.

This factor plus today's emphasis on high sanitation standards are the prime incentives to mechanize cleaning wherever practical.

Dairies Lead the Way

Dairy plants have pioneered automated cleaning in place (CIP) of process equipment, storage tanks, piping, and tankers. Latest CIP practice in dairies and beverage plants is to integrate the cleaning system's controls with those for pushbutton batching.

Such installations are operating at H. P. Hood & Sons, Borden Co., and Pepsi Cola Co. Like all properly designed CIP systems, they have elaborate electrical and mechanical interlocks to assure virtually foolproof operation.

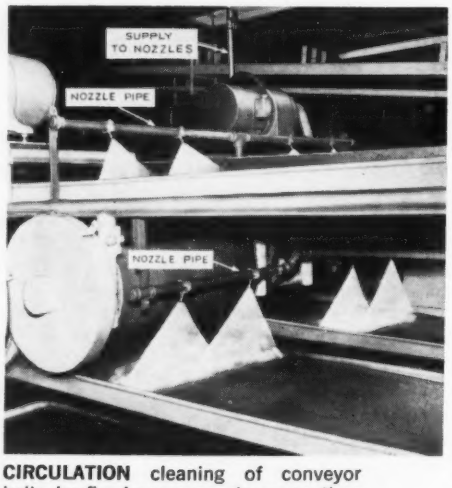
Today, nearly all dairy equipment, except centrifugal machines and filler bowls, can be cleaned by automatic circulation or spray techniques. And many other food-industry branches have adopted CIP for a variety of equipment, as shown in the accompanying table.

SANITATION

Re CIP

Basically, in-place cleaning is accaccomplished by sequential circulation of rinse water, detergent solutions, and a sanitizer through process equipment and pipelines. By-passes and return lines to existing piping provide a continuous circuit.

Cleaning is entirely automatic and no unit in the circuit need be



CIRCULATION cleaning of conveyor belts by fixed spray nozzle saves time and labor, also cuts bacteria counts.

Equipment That Is CIP'd

Here is a partial list of in-place cleaning applications by circulation or spray techniques:

Process units, storage tanks, piping, and tank trucks in milk and dairy-product plants.

Product lines, flumes, break tanks, cookers, and filling equipment in canneries.

Beverage storage and processing tanks.

Evaporators, heat exchangers, and piping in citrus plants.

Churns and pasteurizers in egg-processing plants.

Gravy and ingredient tanks in poultry plants.

Lard and edible-oil refining equipment.

Cookers and piping in margarine plants.

Liquid-sugar storage and transport tanks.

disassembled. Efficient operation, however, does require proper timing of the various treatments, plus control of solution temperature, detergency, flow rate, and spray coverage.

A typical system's principal components include a water source or solution tank, automatic valves, circulation pump, temperature-control and recording equipment, program sequence controller, and detergent-proportioning pumps.

Either stainless steel or glass may be used for CIP piping and fittings. Glass is the more attractive, permits seeing the flow of liquids, and enables easy inspection. Stainless steel, on the other hand, is stronger than glass and permits greater use of existing piping.

Gaskets and joints in CIP piping must be protected against thermal stress and vibration by suitable supports. All lines must be pitched so that product, cleaners, and sanitizers will drain completely.

OPERATOR merely connects 180-deg. ell for automatic in-place cleaning of storage tank at H. P. Hood & Sons.

Perhaps the most important part of the system is the solution-circulating pump. By maintaining proper flow and velocity through the system, it provides physical action which, in combination with detergency, is vital for efficient cleaning.

Thus, pumps must be accurately sized for the particular circuit they will serve. Published data on CIP practice* enable easy calculation of flow rate through stainless steel and glass pipe of known diameter. Recommended minimum velocity for cleaning solutions is 5 ft. per sec.

Pressure drop through the system's pipes and fittings must also be taken into account in pump calculations. Pertinent data are readily found in engineering handbooks.

Temperature control in a CIP system is essential for efficient operation. In general, detergent solutions should be used at the lowest temperature consistent with good cleaning performance. Temperature records are valuable checks on the system's efficiency, and they are useful in dealing with regulatory authorities.

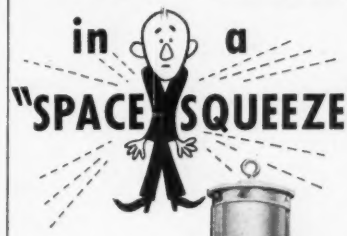
Generally, a single CIP circuit suffices for the smaller plant. Larger ones will usually require two or more. Installation of such systems must be skillfully engineered to make maximum use of existing piping, and to provide flexibility as well as cleaning efficiency.

Cost of the system can be sizable, since additional equipment, piping, and fittings will be required. In addition, it may prove desirable or necessary to relocate piping and rearrange equipment. On the credit side, however, a properly designed and installed CIP system will more than return the investment in many ways and in relatively short time.

(Turn page)

*3A Sanitary Standards

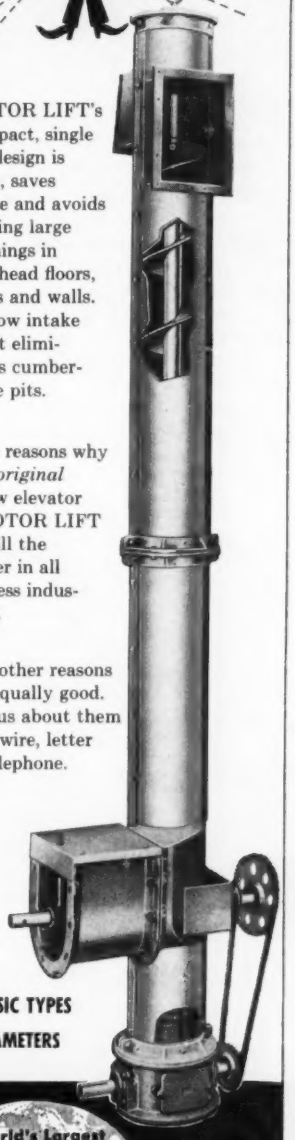
Rotor Lift
—for Processors
in a
"SPACE SQUEEZE"



ROTOR LIFT's compact, single leg design is trim, saves space and avoids cutting large openings in overhead floors, roofs and walls. Its low intake point eliminates cumbersome pits.

Two reasons why the *original* screw elevator —ROTOR LIFT is still the leader in all process industries.

The other reasons are equally good. Ask us about them —by wire, letter or telephone.



8 BASIC TYPES
4 DIAMETERS

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OKLAHOMA CITY, OKLAHOMA

Recommended Operating Conditions for Recirculation or Spray Cleaning*

Equipment	Detergent Solution, Gal.	Rinse Volume, Gal.	Temperature, Deg. F.	Water Pressure, Psi.
CIP pipeline	Full line + 20 gal.	640	150	20–30
Plate pasteurizer	Full system + 20 gal.	800	180	30–40
Storage tank, spray cleaned	30–40	120–160	130	30–35
Processing vat, spray cleaned	30–40	120–160	175	20–30

** From paper by K. A. Fitch presented at Klenzade's 22nd Educational Seminar*

Pays for Itself

Here is how CIP has paid off for Baker Laboratories, E. Troy, Wis.

According to C. R. Johnson, plant manager, the $19,000 system was paid for in 14 months of operation. Formerly, when equipment was taken down for cleaning, daily labor amounted to 42 man-hr. This was reduced to 20-hr. per day when a manual CIP system was first adopted.

However, with the present automatic system, the labor figure has been slashed to 4½ man-hr. per day. Moreover, downtime for cleaning was reduced from 6 hr. per day to about 2¼ hr. And this has provided a 12% increase in production capacity without any expenditure for building expansion or additional equipment.

Automatic CIP has also cut the plant's average total bacterial count by 53%, the B.O.D. of its wastes by 37%, and gallons of effluent by 40%. Finally, automatic dispensing of cleaning materials has reduced their consumption 5½%.

Another example of efficient sanitation practice can be seen at Smithfield Farms, Inc., Liberty, Pa.

At this milk-condensing and drying plant, the CIP circuit includes a double-effect evaporator, tanks, heaters, pumps, and piping. The pan is cleaned by rotary spray arms, the tanks by spray balls.

The system requires only a part-time operator, who merely sets heater controls, makes up cleaning solutions, and starts the circulating pumps.

V.-p. J. E. Brownback, Jr., cites these four advantages of cleaning evaporators in place:

1. Lower steam consumption. Steam is used only for the preheaters.

2. Water savings of some 300 gpm. Since the pan does not operate during cleaning, the only water used is that for dissolving cleaning compounds and for rinsing.

3. Pan operator is free for other duties during cleanup.

4. Saving of both alkaline cleaning compound and acid. Because the evaporator tubes have no external heat, the cool pan walls enable cleaning solutions to function more efficiently.

Conveyors, Too

A relatively recent practice is in-place spray cleaning of conveyor belts by an automatic jet system (Sellers Injector Corp., Philadelphia).

Said to cut both cleaning time and residual bacteria counts, the installation consists of multiple high-pressure nozzles spaced above and below the belt. Flat jets of hot detergent applied against belt surfaces at 125-150 psi. reportedly do a thorough cleaning job.

Nozzles are fed by an hydraulic jet unit that combines plant steam, cold water, and detergent to deliver

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cleaning solution of 180F. Control valves initiate cleaning and rinsing cycles.

CIP for tankers has proved to be an efficient technique for a difficult and potentially hazardous cleaning task. It is hardly reasonable to expect a consistently good job from a man who has to work on curved, slippery surfaces. Actually, he no longer has any business being inside the tank.

Typical equipment for tanker cleaning includes: A spray unit that is easily lowered through a tanker manhole, circulating pump, temperature-controlled solution tank, piping, valves, and pressure gage.

Spray nozzles are specifically designed for complete area coverage. A typical cleaning cycle consists of: (1) Pre-rinse, (2) circulation of detergent according to a pre-determined time-temperature schedule, and (3) hot-water rinse.

Out-of-Place Cleaning

Recirculation cleaning is widely used for equipment not cleaned in place. Take-down piping, small parts, and fitting are efficiently handled in recirculating-type washers. Ultrasonic units have also been used, particularly for very small and intricate parts.

Advantages of this cleaning technique over manual operation include:

1. Use of higher washing temperatures and solution concentrations.
2. Protection of delicate parts from damage, since there is a minimum of handling and parts are contained in baskets.
3. Control of washing temperature and use of detergents.
4. Elimination of a distasteful manual task.

Moreover, the circulating parts washer is extremely versatile. Equipped with a 3-way valve, it may be used as a solution tank in a CIP circuit. In fact, many washers are used for all of the following: Parts washing and CIP of process equipment, storage tanks, and tankers.

Some small milk plants even wash milk cases this way.

SANITATION

Spray-Cleaning Devices

Jet cleaners are used almost universally for equipment not cleaned by circulation techniques. They may be self-contained, portable units or supplied from a central source. Various types of guns apply hot or cold rinse water, steam, temperature-controlled detergents, and sanitizers.

With use of chlorinated detergents, it is possible to clean and sanitize equipment simultaneously.

In addition to general cleaning of floors, walls, and ceilings, this equipment handles:

1. Smokehouses and refrigerator rooms in meat plants.
2. Vats, packaging machines, and equipment exteriors in dairies.
3. Fillers, pasteurizers, hop strainers, brew kettles, and conveyors in breweries.
4. Miscellaneous equipment, such as processing tables, lug boxes, and drums in a variety of food plants.

(Turn page)

No more marking problems

with an automatic "ROLACODER" marker

Attaches to conveyor, case-sealer, etc. to mark from side or top • Works by friction • Imprints legible mark in same spot on case after case • Takes only 1 or 2 minutes to change type • No tricky adjustments • Precision-made for long trouble-free service • Pays for itself in months • Other models for marking 2 and 4 sides simultaneously.

Now available with amazing 'MAGIC INK ROLL' that *never needs re-inking!* Made of PORELON® microporous plastic

Write for "ROLACODER" literature

First and foremost in automatic production-line CODING, MARKING and IMPRINTING machines — Gottscho®

GOTTSCHO Dept. G
HILLSIDE 5, N.J.

CIRCLE 143 ON INQUIRY CARD

CLEAN, SANITIZE, SCRUB EQUIPMENT with jet stream that gets government inspection approval

Only Sellers Jets give the cleaning power needed—fastest, surest cleaning tool in the food industry! Use only your own plant steam and water—let Sellers produce scalding hot water (up to 210°F) in a solid jet stream that literally rips off stubborn grease, sticky film, food residues. Sanitizes as it cleans! Results approved by Government inspection! One demonstration proves why the Sellers Jet is unequalled in the food industry . . . slashing cleaning time and costs as dramatically as it whips through clean-up work. Pays for itself in savings in first few weeks alone. Steps up efficiency, workers love to use it. Get complete details in our Catalog 424B. Send for your copy today.

SELLERS *Injector* CORPORATION

1601-L Hamilton St., Philadelphia 30, Pennsylvania • Since 1848

CIRCLE 73 ON INQUIRY CARD

SANITATION

Tips on Sanitary Equipment

Handy checklist pinpoints design features that speed and simplify your cleaning tasks

YOUR JOB of keeping food equipment clean is half done when you purchase units having sanitary construction. Here are salient design points abstracted from published and proposed standards of various trade associations and regulatory agencies:

General Principles

Properly designed and installed, food equipment:

1. Prevents product contamination and is, in turn, unaffected by foods and cleaning agents.
2. Is readily accessible and quickly dismantled for thorough cleaning and inspection, unless specifically designed for CIP.
3. Has no hard-to-clean areas or places in which contaminants can collect—such as crevices, pits, open seams, dead ends, and square corners.

Specific Equipment

Metal Tanks—Welded construction, smooth finish, rounded corners, removable covers.

Agitators — Suspended if possible to eliminate seals, or easily removable for cleaning of entire shaft. Submerged agitators: Smooth metal, rounded corners, welded to shaft.

Gaskets, Packings—Nonporous, must not protrude into product zone or create recesses between gasketed joints.

Bearings—Sealed or self-lubricated, located outside of product zone.

Thermometer Assemblies—One-piece construction, or inserted into welded well; installed without recesses and readily removable.

Rigid Piping—Sections not over 20 ft. long if continuously filled, otherwise not more than 10 ft. "Take-apart" or CIP external connections, or threadless flanged connections.

Flexible Piping—Nonporous, unaffected by foods and cleaning compounds, sections not over 3 ft. long.

Pumps, Valves, Fittings—Components readily removable, completely self-draining, no internal bypasses.

Meters—Completely self-draining, components readily removable, gear or meter train outside of product zone, cover held by no more than 8 bolts.

Internal Heating Elements—Continuous, smooth tubular metal installed 6 in. or more above tank floor, joined to tank without recesses.

Level Indicators—Located at or adjacent to manhole opening, connected to tank without use of inside threads, have readily removable cap at lowest point for drainage.

Air Filters—Replaceable cartridge type, or housed in removable sanitary assembly. Must trap all particles 50 micron or larger.

Screening Surfaces—Perforated metal, readily removable for cleaning and inspection.

Processing Tables—Corrosion-resistant, all-metal construction; smooth welded seams, rounded corners, edges turned down over greater than 90-deg. radius. Table top welded to pipe-like stands with ball-shaped bottoms.

Produce Washers—Bottom drains, auxiliary overflow, self-cleaning roller conveyor, multiple sprays.

Blanchers—Small intake port below water level, exterior vents, smooth interior construction, steam or hot-water spreader pipe, large air-tight doors, cold-water washout spray, ample floor clearance, tubular supports.

Food-Handling Trucks, Troughs—Welded seams, rounded or coved corners.

Pails—Preferably one-piece construction, or with smooth soldered seams; beaded rim closed with solder, handle welded to pail.

Shovels — Stainless steel or aluminum, welded seams at base of handle.

Hoppers—Cone-shaped, open chute with removable cover, chute supported on swivel, round-bottomed flumes.

Belt Conveyors—Sealed pulley ends, hinged rail cover, tubular legs, return belt "idled" well above catch pan, latter readily accessible.

Worm Conveyors—Removable panels on chutes, all internal parts easily accessible.

Pneumatic Conveyors—Smooth piping free of concealed pockets where product can collect.

Product Coolers—Sanitary "take-apart" or CIP external connections; or threadless flanged connections on inlet and outlet ports, as well as product pipelines and elbows. Higher pressure in product line than in refrigerant line to prevent food contamination should leaks occur.

Grinders—Drain ports at top and bottom of shaft housing, parts easily removable.

Colloid Mills — Smooth rotor-shaft housing, rounded corners, free of pits. Runoff below rotor smooth, removable.

Drum Driers—Pans or troughs of smooth metal, no open seams or dead ends, perforated pipe and doctor blade removable for cleaning.

Cubers, Dicers—Knife, comb, and discharge assemblies that can be completely disassembled for thorough cleaning.

CIRCLE 75 ON INQUIRY CARD→

What can lemon juice do for breaded shrimp?

It prevents loss from black spot while shrimp awaits processing. A lemon juice dip (1 part Exchange Concentrated Lemon Juice to 40 parts water) retards darkening enzymatic action, bacterial growth and fishy flavor development. Lemon juice in breading batter helps reduce bacteria count, freshens the shrimp by dissolving out any accumulated trimethylamine, and improves the flavor.

For canned soups?

Exchange Concentrated Lemon Juice helps improve flavor. Used below the threshold of lemon taste, it enhances characteristic flavors of a wide variety of soups—including cream of mushroom, cream of tomato, vegetable-beef pepper pot and bouillon—without imparting any detectable lemon character.

For your product?

Send us the coupon today—and let our researchers tell you what lemon juice can do for you.

Sunkist Growers

Products Sales Dept., 720 E. Sunkist St., Ontario, Calif.

GENTLEMEN: *Our product is* _____

_____ *How can lemon juice help?*

NAME _____

ADDRESS _____

CITY _____ ZONE _____

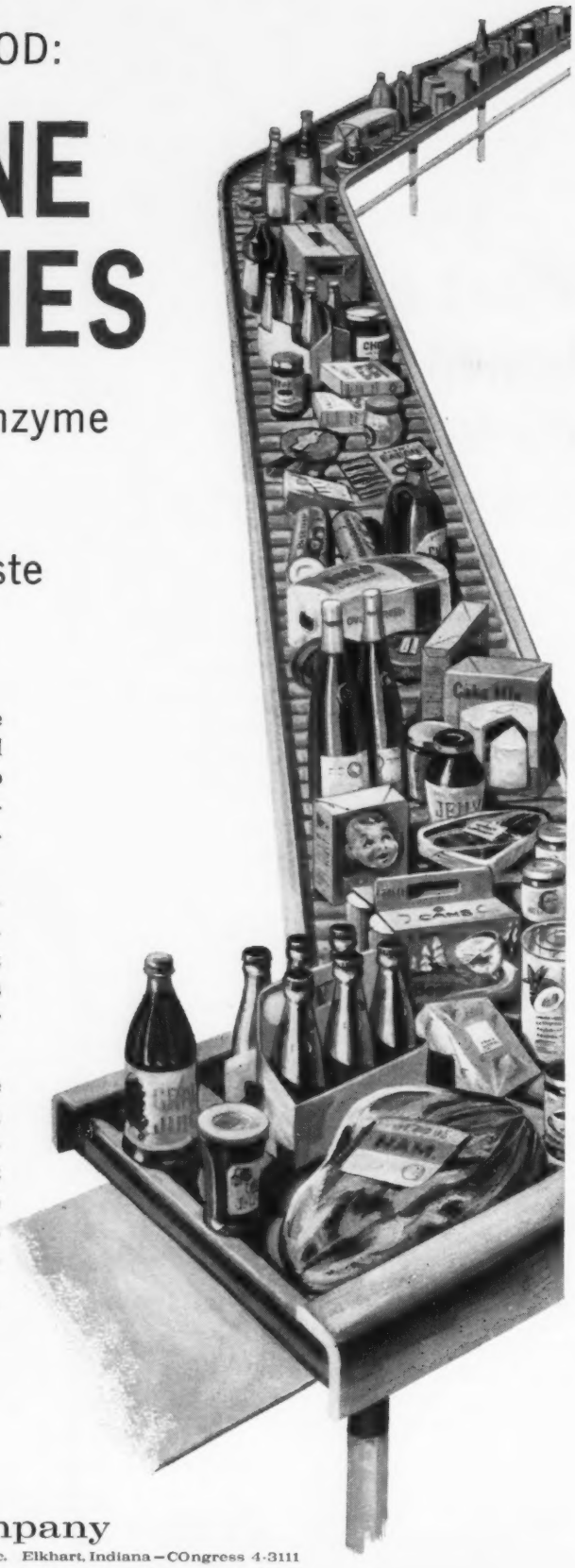
STATE _____

Exchange

Miles has a way with FOOD:

TAKAMINE ENZYMES

...industry's biggest enzyme family made to fit your product's good taste



Exactly what does that mean to you?

A great deal. Producing the biggest enzyme family means that Takamine can recommend the precise *enzymatic activity* best suited to your particular job, whether it's starch conversion, proteolysis, removal of pectins, glucose or oxygen removal, or others.

Refined manufacturing techniques have resulted from this broad experience with enzymes. This means we can achieve the exact enzymatic activity required for specific jobs . . . *and maintain its uniformity*, batch after batch after batch.

So if you now use enzymes to enhance flavor, guard color and stability, lengthen shelf life or speed processing . . . or if you suspect you could use enzymes profitably . . . let us recommend a Takamine enzyme for the job. We don't believe you can find enzymes more precisely matched to your needs anywhere.

T-2-1

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Marketing Signals

The expensive sell . . .

Cholesterol again . . .

'Seed' business grows

How Food Firms Made Out

Food beverage makers (excluding meat packers) punched out a 7% sales gain the first half of '61, according to an FE check of the interim reports of 76 companies. Profits perked up 5%.

All sectors, except breweries, posted volume gains —as packaged goods paced the field with a spanking 12% upsurge. Ironically, though, brewers showed the best profit improvement with a 13% gain. Canners and freezers upped their earnings 10% on a 5% sales rise. Dairy firms and bakers saw profits dip 8% and 14% respectively.

Ad Spending Grows and Grows

Rising media rates, new product promotions, and market expansion drives helped to triple ad expenditures by food marketing firms in the last 15 yrs. According to a new study by USDA's Economic Research Service, food industry's ad outlay topped $1.3-bill. last year, was 12% of total advertising.

Other survey highlights: 1) Food makers with assets over $10-mill. spend 3% of sales on ads. 2) Biggest advertisers in food field are canners, bakers, dairies, and certain multi-item outfits. 3) Bigger the food firm, greater the share of sales put into promotions.

New Wrinkle in Fats Tussle?

Pacific Vegetable Oil is readying a two-pronged marketing push behind safflower oil-based products. Outfit will retail salad oil and mayonnaise under its own label, and will work with Durkee Famous Foods in selling the oil to margarine producers.

With cholesterol a big thing in margarine advertising, promotion is expected to lean hard on the fact that safflower oil is a highly poly-unsaturated vegetable oil with a ratio nearly twice that of corn oil. One source estimates that margarine firms may use as much as 40 to 50-mill. lbs. of safflower oil a year.

Overseas Seeding Spreads

International marketing continues to gather momentum. Witness these 3 developments:

. . . **Food makers this year will spend $142-mill. on new plants abroad,** or 42% more than last year, estimates U. S. Commerce Dept. Outlay almost doubles food's 1957 investment.

. . . A study by Booz, Allen & Hamilton of U. S. expansion into foreign markets finds **food firms accounting for 11% of the activity.** Two most popular tacks followed: Joint ventures and wholly-owned subsidiaries or branches.

. . . General Foods overseas business will **represent about 10% of net sales this year vs. less than 4% 3 yrs. ago,** says Pres. Wayne Marks.

Borden Moves Deeper Into Marketing

Obviously pleased with the success of its food division's marketing concept (see FE Feb. '60, p. 48-50), Borden Co. has moved to spread the benefits company-wide. Company set up a new corporate marketing services department to aid various operating divisions. Robert E. Kahl, former exec. v. p. for Borden Foods, heads the new unit.

Lever Bros. Offers 'Instant Money'

Redemption of coupons, one of the biggest stumbling blocks in the way of better manufacturer-dealer relations, sparks a new Lever Bros. program.

Under a new "instant money" plan, each retailer gets a specially pre-printed invoice and sight draft. Dealer totals his coupons on the invoice, makes out a draft payable to himself. He returns the invoice to Lever and deposits the draft in his own bank account.

W. N. Burding, exec. v. p., says the plan **should help curb coupon misredemption as well as answer the retailer's need for capital turnover.**

BRIEFS

Annual salaries and bonuses for regional sales managers of food firms range from $6,500 to $18,000—with the median at $13,000—according to a spot check by GMA.

Credit card service now offered by Loft Candy.

Network TV spending by food firms rose 19% for the first 5 mos. of '61, reports TV Bureau of Advertising.

Discount houses with a full food line may do $1.5-bill. this year, or 3% of all U. S. food store sales, predicts Audits & Surveys Co.

Top 25 brewers siphoned off 75.6% of all beer sales last year vs. 60% in '52, according to Research Corp. of America's annual analysis of the field.

Justice Dept. probe of food prices now includes edible oils on the West Coast.

Package Design— Your Key to Sales Appeal

Deciding factor in battle for consumer attention may well depend on your product's package appeal. Here are key performance needs, plus checklist guide to sales-getting design

TWIN PROBLEMS today are growing competition and shrinking retail shelf space. These are forcing management to constantly review all marketing factors to help weed out possible sales-inhibiting weaknesses.

Yet, one very basic marketing tool, the package, is sometimes treated almost as an afterthought. And when all signs point to poor packaging as the culprit in declining volume, management flounders in a sea of design indecision.

Needed is a successful formula for package design evaluation which judges these four areas of performance:

In Distribution:

Package must be safe and communicative as it moves from plant to warehouse to wholesaler, and into retail stores.

Safety-wise, it must be a well-constructed "shipper" that can take the knocks and jars of loading and unloading. Good communication requires proper carton identification of contents on all sides to assure quickest possible handling. Also needed are adequate warnings for fragile products and easily understood instructions for opening.

In Supermarkets:

Here is probably the biggest single area of package performance. Although requirements vary with individual products and their packaging materials, answers to following questions will help determine appeal:

► Does design stand out, or are colors similar to those of competitors wherein all items merge into one mass display?

► Do graphics allow instant product and brand recognition?

► Is there (depending on product) a proper male or female appeal?

► Does total design reflect high quality?

► Is there proper appetite appeal?

► Does the design lend itself to mass display use?

► What are the number of average facings for this type of product?

After considering these questions, you have still dealt with only half of the total problem. Further study is needed to ascertain the "functional" package requisites. Checkpoints are:

► Is there a spot for price marking?

► Is container designed for stability on shelf or, in the case of glass jars, are they engineered to nest correctly in stacking?

► Are pilferage factors present and can they be overcome?

► Do overall package measurements conflict with retailer shelf space allotment?

► Does package really protect? Are overwraps secure?

► Are closures and glued flaps adequate?

In the Home:

Whether the housewife will come back and buy your product again may well depend on how your package fares in her kitchen. Consider:

► Will the design make the product stand out in storage so that the housewife will be constantly attracted to it and be reminded to use it?

► If infestation is a potential problem, has it definitely been overcome?

► Has the package been constructed to last as long as the product?

► Will the package size really fit in the area where usually stored—pantry, refrigeration, and cupboard?

► Does the closure really function in manner indicated?

In Media:

Package must present itself forceably in magazines, newspapers, and television. Then the shopper will know what to look for in the store. A poorly designed package that gives a weak impression in media will do the same on the shelf. Don't ask the housewife to keep a virtual "blind date." Don't expect her to search through a store's more than 5,000 items to find the one your advertising has sold.

How To Use Data

Even with all these areas properly defined, the information is useless unless each factor is weighed, correlated, and applied to the total packing problem.

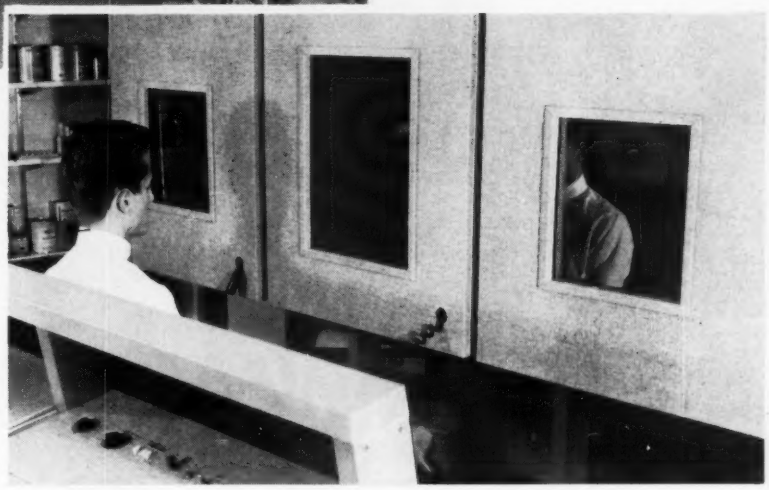
Professional designers may be a solution. They will meet with you to determine as much about the product as possible and then meet with the advertising agency to ascertain plans for promotion.

In addition, a comprehensive study of the package's natural habitat—the supermarket—can be initiated to evaluate competition and retailing methods in main marketing areas. When the final design is completed and "mock" packages created, testing in restricted marketing areas might be suggested. Or outside research may be recommended to substantiate the design value.

Our firm has established an exclusive and unique method of "bringing the supermarket back

ROBERT SIDNEY DICKENS
President, R. S. Dickens, Inc., Chicago

PROTOTYPE SUPERMARKET brings retail store back to studio. Package designers devise strategy in realistic environment with competing products.



PRE-TESTING DEVICES used by professional designers include (l-r): Relative visibility meter to evaluate a package's head-on visibility. Angle meter to record ability of design to project identification from acute angles of approach. Vision impact meter to measure design's recognition-recall value.

to the studio" through the creation of a "supermarket laboratory." This merchandising lab is complete with 1,000 ft. of shelving, working refrigerator-freezer cases, and intricate lighting mechanisms capable of recreating any type of lighting from the dimmest small store to the brightest modern supermarket.

Let's imagine that a pre-design retailing study is being planned for Brand W Cake Mix, a nationally distributed product. We would first sit down with company executives to determine typical marketing areas. These would be broken down geographically. We would then plot an itinerary of individual establishments to be surveyed, including chains, independent supermarkets, and even "Mom and Pop" stores.

A field man then personally visits each outlet. Using a special survey form, he lists pertinent facts concerning the department under study (cake mixes). He also records location of store, size, type of customers (white or blue collar), and whether the trading area is commercial, residential, or rural. Names of all brands, facings, stacking methods, etc., are recorded in detail. A series of 35 mm. color slides is taken to provide visual evidence. A final step requires purchase of all competitive brands.

Data and samples are then brought back to the lab. Store reports are analyzed, tabulated, and then summarized into various common denominators: Methods of stocking, lighting conditions, adjacent visual competition, colors commonly in use, stacking patterns, current merchandising trends, average department dimensions, preferred location of department in store, average facings per brand, typical national and local brands in section.

Pilot Market Plant

With these facts established, field men are able to create in the laboratory an average cake mix department for study by designers assigned to the problem. Before drawing the first sketch, designers will know what to avoid in colors and graphics, and areas still open for possible exploration.

Aside from dry shelves, this survey data will also reveal the median type of case being used in the majority of stores featuring daily products. In this field alone, there are any number of types of cases such as refrigerated shelving, upright door case, and two-well case. It's important to know whether your products are generally found at eye level, face out, or top visibility only. If design emphasis is placed in the wrong area, sales potential can be seriously crippled.

It must be remembered, however, that this type of study is not needed in each and every packaging problem. Regional brands and products with limited competition can generally be surveyed simply and with a minimum of cost. (End)

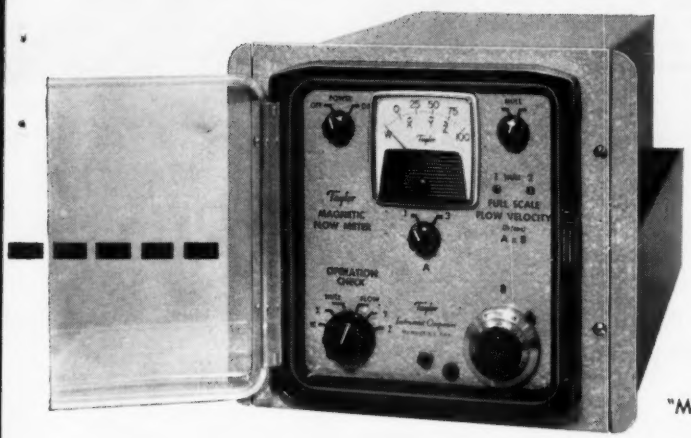
712NE
"MAG-PIPE" Sensing Head

Taylor presents a **MAGNETIC**

OUTSTANDING FEATURES

- High accuracy—½% of full scale on most ranges.
- Full scale velocities as low as ½ ft./sec., at only slightly reduced accuracy.
- Conductivity range—as low as distilled water.
- Rangeability—½ to 30 ft./sec. full scale calibration, continuous vernier adjustment.
- Amplifier—solid state.
- Ideally suited for long transmission runs to a central control panel.
- Output signal—1-5 ma DC into any load from 0-3000 ohms. (Electro-Pneumatic Transducer or TRANSCOPE Electronic Control System).

Taylor Instruments



717TE
"MAG-PIPE" Transmitter

FLOWMETER TRANSMITTER WITH 1/2% ACCURACY

The new Taylor "MAG-PIPE" Magnetic Flowmeter Transmitter is a high quality, high performance transmitter with an output signal of 1-5 ma suitable for transmission over long distances. It can therefore be used with miniature receivers and controllers in central control rooms.

It is designed to measure flow of fluids with an electrical conductivity as low as that of distilled water. It is ideally suited for very low flows, viscous liquids and liquids containing suspended solids, since the flow is not in any way restricted by the primary element.

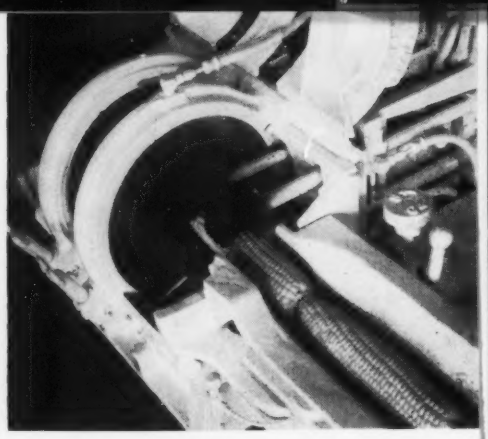
The "MAG-PIPE" sensing head is mounted in the flow line. It comprises a flow tube, an AC magnetic circuit and two electrodes. The sensing head housing is "hose-down proof" (explosion-proofing optional), and has Van Stone type flanges for easier, faster installation.

The transmitter employs *solid state* components, being fully transistorized for long-term reliability. It is standard in fixed-range form, in which case calibration is factory set at the desired range. Optionally available with a full-scale vernier adjustment on two ranges. A built-in output meter doubles as a circuit checking device.

The "MAG-PIPE" Flowmeter Transmitter is in production. Consult with us on your difficult flow measurement problems. See your Taylor Field Engineer or write for **Bulletin 98418.** Taylor Instrument Companies, Rochester, N.Y., and Toronto, Ontario.

MEAN ACCURACY FIRST

DOUBLE CORN HUSKER (feed end) handles double amount of ears of singie husker. It features vibrating hoppers, grooved rubber rolls, and safety devices.



NEW CORN CUTTER (hood removed) has yield-boosting automatic size detector. Unit's fewer parts lower maintenance costs and reduce jam-ups and downtime.

Canner Updates Line Operations

Installed new corn-canning units spur production and safety. Product quality safeguarded, too

NO NEW MODERNIZING idea is too small to be put to work. That's the philosophy of cost-cutting and production of better and more uniform products at Oconomowoc Canning Co.'s corn cannery, Sun Prairie, Wis.

The plant has installed several new units to improve its canning operations. Here's how these new installations have paid off dividends.

1. Double huskers.

New double huskers, as opposed to single ones, have doubled output within same space requirements. These huskers (with a double set of husking rolls) now handle two tons of ears hourly. Other benefits from them:

. . . **Smoother performance.** New machines have been installed side-by-side for straight-through product flow, with shorter (1½ ft.) chutes discharging cut butts directly onto take-away conveyor. Unit's vibrating hopper aids in speeding flow of ears (from butting knives) through paired husking rolls.

. . . **Simpler maintenance.** Large feed conveyor has non-breakable fabricated steel flights. Motor drive features long-wearing silent V-belt. Sectioned grooved husking rolls permit easy replacement of worn sections, without cost of replacing entire roll. And shear-pin safety device guards against costly repairs.

. . . **Easier cleaning.** Husking rolls are exposed—former units had them under husking bed.

. . . **Better safety.** Casing houses butting knives. Guards restrict operators from machines' moving parts. V-belt drive shaft is shielded.

Here's how new huskers operate. From a 2x60-ft. conveyor belt, corn is alternately swept by diverter plates onto chutes feeding ten huskers driven by built-in motors (3 hp.). A girl on each side of feed table supplies ears to each husker. Corn is then carried forward by chain-driven crossbar conveyor through self-adjusting, husk-loosening devices.

Simultaneously, roller-pressure arms diagonally transfer ears along moving chain (across feed table) into butting gauges that align them with stationary butting knives. Butts are held by adjustable pressure arm so each ear is cut at shoulder—enough to sever husk strands secured to cob. They are then chuted to conveyor carrying them out of cannery for disposal.

Meanwhile, husks are loosened from butted ears by a corn-driven husk-loosener. Rolls firmly grip loosened husks, pull them away from kernels as ear slides freely through vibrating husking hopper.

As a safeguard, each husker is equipped with a device that quickly dislodges ears which may be up-ended in grip of rolls, and positions ears into horizontal husking position.

Rolls are newly designed. They're of tough, semi-hard rubber, with spiral grooves running lengthwise. Moreover, each of the four rolls is triple-sectioned so each section can be quickly interchanged or replaced. Cost of maintaining new rolls is estimated to run less than one-third that of softer rubber rolls. Significantly, the spiral grooves permit rubber rolls to grip and remove husks as efficiently as softer rubber ones that require higher upkeep.

2. Micro switches.

Attached to each roller pressure arm is a snap-action switch (two to a husker) electrically hooked up to wall-mounted, panel-enclosed counters.

Counters keep a running tally on number of ears fed through huskers. They also provide a check on performance of day and night crews.

3. Corn cutters.

Since entire line's production output is keyed to double huskers' performance, plant has installed a dozen new cutters (FMC's 3A's). These cutters feature automatic ear-size detectors that pre-open knives and permit cutting of mixed ear sizes to desired depth—without size grading or machine adjustment. Result:

. . . **More yield.** Up to 7% more per ear—and with minimum damage to kernels.

RICHARD WEIX and M. L. GERDES

Respectively, Production Manager, Oconomowoc Canning Co., Oconomowoc, Wis., and Application Engineer, Food Machinery & Chemical Corp., Hoopeston, Ill.

. . . **More output.** Up to 20% more per cutter.

. . . **More cutting.** Up to 50% more between honings.

Moreover, fewer and more accessible parts require less maintenance and curb jam-ups.

How Cutters Operate

New cutters work this way: As ear is carried into cutter head housing, it's guided through feed rolls that center and align it. Each ear is then guided through two pairs of spring-loaded rubber rolls. Second set of rolls is mechanically linked to cutter knives, preset to desired cutting diameter by opening of the rolls.

Cutter's adjusted to change from whole kernel to cream style corn or vice versa. Yoke adjustment (in the linkage from feed rolls to knives) has two settings—one for whole kernel and the other for cream style.

While cutting whole kernel corn, gauging mechanism presets knife opening. After ear enters knives, the force, heel and cutting angles of knives as well as physical properties of cobs and kernels control the cut. Depth of cut is varied with an adjustment knob. Result is that each ear is gauged individually, and knives follow the contour of cob to cut off the desired depth of kernel.

Automatic gauge of each ear individually assures proper cutting, without operating personnel being concerned about making manual adjustments to compensate for changes in corn varieties or ear sizes. Cutter actually "thinks for itself" to free operators from making repeated adjustments.

Cream style corn requires a different yoke setting as well as a second cutter head with scraper blades. Here, gauging mechanism restricts depth of cut, which is made at a preset depth (below tops of kernels). Then, scraper blades remove remaining product. Again, depth of cut is varied with adjustment knob.

Other features: A cob-release lever trips open cutter knives in event of jam-up. This way, operator no longer has to stop cutter and open cutting head to unjam cutter. Another lever clears jam-ups by opening both feed rolls of knives. Housed revolving cutting head also sucks in lubricant, eliminates periodic stopping of cutter to lift head for manual lubing.

4. New corn washer.

Another highly efficient feature recently installed is an Olney corn washer. Unlike former tank-type washer with its auger discharge, new unit handles corn more gently and does a better cleaning job.

Operation of new washer starts by introducing starch (10-20 lb.) to wash water. Starch froths up washer water, facilitates separation of foreign matter from kernels which, in time, also introduce their own leached-out starch.

Kernels are pumped from shaker-type silker to new washer, where they sink to its V-bottomed hopper as foreign matter is floated over a weir to a rotating reel and then into a refuse container. Water jets (at bottom of hopper) buoy kernels out of hopper (along vertical baffle plate) and then over shaker rinser. Kernels are then discharged onto inspection belt prior to can filling. Washer water is re-used as starch is built up as a result of kernel leach-out.

5. Efficient canning.

Corn cutters flank both sides of conveyor belt carrying kernels to filling machines. Arrangement provides flexibility in handling kernels during peak volume (when canning receives extra ears). In this case, some of the additional kernels can be diverted from 16-oz. can packs to 12-oz.

Can filling and closing lines have been set up to operate at 92% efficiency. One way it's done is by holding downtime to a minimum—about 3 min./hr. These lines operate at a 360 cpm. capacity. Packing's at a rate of 900 cases/hr.

Vacuum-closing machines assure high vacuum and eliminate need of filling hot corn into cans. Filling at 120 F., instead of former 180, enables packing brighter looking kernels.

6. Better retorting.

Employed is a brand-new 3-shell (pre-heater, cooker, cooler) continuous retort (FMC's Sterilmatic) to complement an existing '41 model. New unit is designed to provide flexibility in the rapid change from one size can to another. Unit's adjustable inner T's and angles are of longer lasting stainless steel that holds up almost four times as long as conventionally used carbon steel.

Throughout new continuous cooker are automatic controls such as these:

. . . **Protective stops to curb shut-down delays, to protect equipment and to reduce maintenance costs.** Stops are located at feed elevator (to prevent improperly positioned cans from entering feed valve) and top of transfer valve. Discharge chute drop-out sounds an alarm and lights up the panel board whenever cans aren't being conveyed from the Sterilmatic.

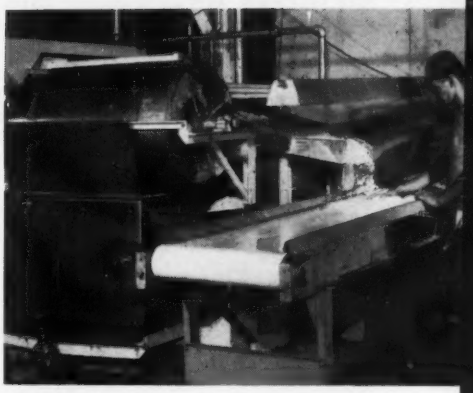
. . . **High-low water signals.** Level of water in cooler is maintained by a float-control. Similarly, micro switches close relay circuits of squawkers when level is too high or too low. Cooling is temperature controlled to assure proper cooling of each can.

. . . **Safety clutch (feed valve).** Clutch stops cup feed and feed valve without shutting down cooker. Result is that cans within cooker continue their cooking cycle while cup feed and valve are idle.

. . . **Reel stop.** It stops cooker reel when temperature drops 1F. below controlled set point—assuring proper heat treatment of all cans.

. . . **Centralized control panel.** It's equipped with temperature recorder-controllers (preheater and cooker shells), gauges (air, steam, water and electrical) and a visual luminous readout panel. Latter comprises a dozen warning readouts, easily identified, which are hooked up with switches.

Another innovation is a simple system for continuously chlorinating inside of cooler reel. A 50-gal. wooden barrel mounted above reel permits gravity-dripping of chlorine solution (4-6 ppm.) inside cooler. System has prevented possible bacterial build-up when kernels accumulate within cooler—also reduces chance of bacteria entering cans through seams. (End)

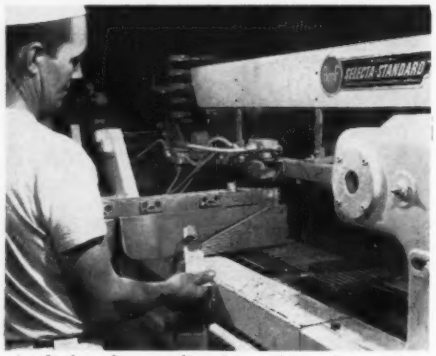


CORN WASHER does better, more gentle job of cleaning corn kernels than formerly used tank-type unit.

SILICONE NEWS from Dow Corning

Sticking Gets The Slip

Applied to milk evaporators, preheater tubes and plug valves, SLIPICONE aids sanitation . . . facilitates removal of milk splatter . . . prevents trouble caused by sticking parts.



Applied to heat sealing bars of bread wrapping machine, SLIPICONE increases heat-transmission and film-sealing speed . . . prevents sticking and tearing, browning and ink smear.

SLIPICONE Keeps Equipment Clean For Peak Efficiency

Got a sticking problem? Solve it with SLIPICONE®, the Dow Corning *silicone release agent.* SLIPICONE puts a slick, stick-free surface wherever you want one . . . prevents adhesives, packaging materials and products from sticking to (or piling up on) any surface. Thus, SLIPICONE speeds operations, reduces waste, keeps packages clean . . . *saves money!*

Safe—Heat Stable. Nontoxic SLIPICONE is safe to use in contact with fresh, frozen or baked foods*. Temperature extremes have little or no effect on SLIPICONE . . . it stays on the job — prevents sticking — from 40° below zero to 400° F.

Easy does it! A thin coating of SLIPICONE is all it takes. Simply spray or wipe it on any surface as needed. Get SLIPICONE from your paper wholesaler or packaging materials supplier.

SLIPICONE comes in 2 oz. tube, 8 oz. tube, and 12 oz. aerosol . . . to wipe or spray sticking problems away!

*Write Dow Corning, Dept. 4721a, for complete data on use of Slipicone in the food processing industry.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

How The Food Industry Uses Enzymes

Items in bold face represent relatively new agents and/or uses.

ENZYME	PRODUCT	USE
Amylases	Beer	Mashing
	Baking	Bread Baking
	Cereals	Precooked Baby Foods
	Chocolate, Cocoa	Syrup Clarification
	Candy	Scrap Candy Recovery
	Distilled Beverages	Mashing
	Fruits & Fruit Juices, Pectin	Starch Removal
	Corn	Corn Syrup
Amylo-Glucosidase	**Corn**	**Production of Dextrose**
Bromelain	**Fish**	**Fish Hydrolysates Fish Solubles**
Catalase	**Dairy**	**Cold Sterilization of Milk**
Cellulase	**Beer**	**Mashing**
	Fruits & Fruit Juices	**Clarification & Extraction**
	Vegetables	**Tenderization**
	Feeds	**Poultry Starter Beef Fattening**
Dextran-Sucrase	**General**	**Thickening**
Flavor Enzymes	**Vegetables**	**Restores Flavor**
Glucose Oxidase	Beer	Oxygen Removal
	Carbonated Beverages	Oxygen Removal
	Eggs, Dried	Glucose Removal
	Mayonnaise	Oxygen Removal
	Fruit Slices	Oxygen Removal
Hemicellulase	Coffee	Coffee Concentrates
Invertase	Candy	Soft Centered Candy & Fondants
Lipase	**Eggs, Dried**	**Whip Enhancer**
	Cheese	**Flavor Production**
	Chocolate	**Flavor Production**
Oxygen Scavenger Packets	**Dairy**	**Dried Whole Milk Dried Ice Cream Mix**
	Meats	**Freeze-Dried Meats**
	Baking	**Cake Mixes**
	Miscellaneous	**Nuts, Vegetables, Potato Chips, Fats**
Pectinase	Fruits & Fruit Juices	Clarification, Filtration, concentration
	Coffee	Coffee Bean Fermentation
	Wine	Pressing, Clarification
Protease	Beer	Chillproofing
	Dairy	Milk, Protein Hydrolysates, Cheese Production, Prevention of oxidation Flavor in Milk
	Feeds	Poultry Starter, Beef Fattening
	Meats	**Ante-Mortem Tenderizer Injection, Tenderization Freeze-Dried Meat**
Acid Protease	**Feeds**	**Pig Starter Protein Hydrolysates**

How Latest Enzymes Sharpen Your Process Control

New agents and techniques permit unique modification of carbohydrates, fats, and proteins. They also enhance flavor and preserve foods

ENZYME TECHNOLOGY now offers food processors new tools and improved techniques for delicate and intricate tasks.

Recent developments fall into three categories:

1. Novel enzyme products.
2. New applications for existing enzymes.
3. Easier-to-use formulations.

Here's how they can boost your processing efficiency.

Latest Enzymes

► **Cellulase:** Only recently has an enzyme capable of breaking down cellulose been commercially available.

$$\text{Cellulose} \xrightarrow{\text{Cellulase}} \text{Cellulodextrins} + \text{Glucose}$$

The enzyme is remarkably stable to acids and heat. After 1 hr. at pH 2.2 and 37C., a cellulase solution retains 90% of its activity. At pH 4.0, about 85% is retained after 4 hr. at 60C. It is active over a pH range of 2.5-8.0, with optimum activity at about pH 3.5.

In brewing and distilling, it can produce additional fermentable sugars from the mash — an increase in yield not attainable by other chemical reactions.

In citrus processing, cellulase may be used to remove cellulose cloud from orange and lemon juices and concentrates.

In vegetable canning and freezing, it can split cellulose fibers of green beans and other fibrous vegetables to improve their palatability.

Cellulase has also proved useful in animal feeds and waste disposal.

► **Lipase:** A new lipase produced by microbial fermentation has considerably higher lipolytic activity than that attained from pancreatic lipases. The new enzyme is active over the pH range of 4.0-7.0, with optimum activity at about pH 6.5 and 37C.

Although hydrolysis of fat is highly undesirable in many foods, there are useful applications of such a reaction. (Turn page)

R. R. BARTON and C. E. LAND, Jr.
Respectively, Assistant Director of Research and Technical Service Representative, Miles Chemical Co., Clifton, N. J.

Dried egg albumen, for example, may contain residual fat-containing yolk that reduces its whipping quality in cake mixes and confectionery. Use of lipase[1] will modify these fats, thereby increasing egg-albumen quality.

During refining of cheese, slight hydrolysis of butterfat produces traces of acids which impart desirable flavor to the aged cheese. Work at the U. of Wisconsin[2] has resulted in rapid production of a blue-cheese spread.

In this method, lipase is added to milk and, after 24 hr., the mixture is pasteurized. After blue-cheese spores are added, the mass is aerated for 2 hr. Product is then ready for packaging. Contrast this with the old process which requires several months.

Proper flavor in milk chocolate is developed by use of lipase for production of fatty acids. In this case, it would appear that release of lower molecular weight acids is desirable.

► **Dextransucrase:** Produced by microbial fermentation, this enzyme catalyzes the reaction:

$$\text{Sucrose} \xrightarrow{\text{Dextransucrase}} \text{Dextran} + \text{Fructose}$$

Size of the polymer is regulated in part by the concentrations of sucrose and enzyme, and by duration of the reaction. In general, this reaction proceeds best in neutral to slightly acid solutions.

Viscosity and body of sucrose-containing foods may be increased by addition of this enzyme. It can also be used to produce edible lubricants.

► **Amyloglucosidase:** This amylolytic enzyme is unique in that it hydrolyzes both the 1,6 and 1,4 glycosidic linkages of starch.[3] Thus it converts starch to dextrose without intermediate formation of dextrins and maltose.

$$\text{Starch} \xrightarrow{\text{Amyloglucosidase}} \text{Dextrose}$$

Langlois and Turner[4] report that a 20 Be. corn-starch slurry can be converted to a 93-D.E. syrup containing 89-90% dextrose, 1-4% higher sugars, and essentially no dextrin. This requires 48 hr. at pH 4.1 and 60C.

Amyloglucosidase, described by Phillips and Caldwell,[5] is now of interest because of improved fermentation yields. Its most promising large-scale use is production of crystalline dextrose from starch. The process consists of thinning high starch concentrations with acid or a liquefying amylase, then treating with enzyme.

► **Flavor Enzymes:** During processing and storage, many foods suffer at least some loss of natural volatile flavor. However, it has been postulated[6] that flavor precursors present in foods can be converted to flavor compounds by use of appropriate enzymes.

$$\text{Flavor precursor(s)} \xrightarrow{\text{Enzyme}} \text{Flavor compounds}$$

For example, an enzyme preparation extracted from fresh corn kernels was used to improve the flavor of canned food.[7]

Barton[8] obtained by microbial fermentation, an enzyme preparation that improved the flavor of canned, frozen, and dehydrated green beans, peas, and lima beans. The action of this enzyme is oxidative, and its extent could be followed by increase in carbonyl content of the treated food. Also, a reasonably good correlation between carbonyl content and taste panel acceptance was found.

Potential uses for flavor enzymes include military and institutional feeding, where large quantities of foods are exposed to rigorous treatment during preparation and serving.

► **Acid Protease:** Most commercially available proteolytic enzymes have maximum activity near pH 7.0. The major exception is pepsin, whose optimum pH activity is about 2.0.

Recently, a microbial enzyme has been developed which is also active at low pH. However, in contrast to pepsin, it is active over the pH range 2.4-6.0.

This enzyme also exhibits good stability at low pH. Over the range 2.2-3.0, 80-100% of its activity is retained after 1 hr. at 37C.

Considerable potential exists for this enzyme as a digestive aid and in preparing protein hydrolysates.

New Applications

► **Meat Tenderization:** Bromelain, papain, and microbial proteolytic enzymes, singly and in combination, have been used to tenderize meat. In some cases, the preparation is sprinkled on the meat cut, or the cuts are dipped into enzyme solutions.

Achieving good penetration and distribution of the enzyme throughout the meat has been a problem. But it has recently been solved by one of the larger meat packers.[9]

Just prior to slaughter, the animal is given an intravenous injection of a proteolytic enzyme. This enables almost complete distribution of the enzyme throughout the carcass. Not only is uniform tenderization of the meat possible, but the time required to age the carcass is cut to one or two days. This reduces shrinkage, which means higher yields for the packer.

Other methods similar to stitch pumping are also under investigation.[11]

Freeze-drying has produced several good meat products. For truly tender meat, these highly porous items need only be rehydrated in an enzyme solution.[10] During cooking, there is ample time for adequate enzyme action.

► **Oxygen Scavenger Packets:** Oxygen can be removed from dehydrated foods by the action of glucose oxidase. The enzyme plus glucose and liquid, in a gas permeable but water-tight packet, are placed in a hermetically sealed container.

$$2C_6H_{12}O_6 + O_2 + H_2O \xrightarrow[\text{Oxidase}]{\text{Glucose}} 2C_6H_{12}O_7 + H_2O_2$$

$$2H_2O + O_2 \xrightarrow{\text{Catalase}} 2H_2O_2$$

Net reaction:

$$2C_6H_{12}O_6 + O_2 \longrightarrow 2C_6H_{12}O_7$$

Because the reaction mixture is not in contact with the item being protected, it can be adjusted to optimum conditions of pH and component concentration. Packets will take oxygen from a container readily, reducing the oxygen content essentially to zero in 24 hr.

This technique has an advantage over vacuum or gas packing in that oxygen entrapped within a food particle will be removed after the container is sealed. For example, oxygen trapped in the hollow spheres of spray dried milk cannot be removed by gas packing. But, as it diffuses into the headspace after packaging, it will be removed by an oxygen scavenger.

Loss of liquid from a packet during storage is slight and, in most cases, would not have any effect on the food.

Tests with whole dried milk and ice cream mix indicate that flavor

Mack
628
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ILL CC 2421 MC PR-OKLA 836
PSC 14519 A-ARK M 1154
MICH L 8324 - MOT 10974
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Research-oriented, quality-conscious and profit-minded, Quality Carriers, Inc., Burlington, Wis., considers Macks an all-important part of both its liquid-foodstuff hauling fleet (shown here) and its petroleum and chemical transporting affiliate, Bulk Transport. Quality just recently opened its new Chicago terminal . . . and has inaugurated a new method of handling dry bulk commodities in pressure vessels unloaded by air.

Burlington, Wisconsin, carrier stresses

QUALITY in name..service..and equipment

In 1939 Lee Barney and Pat Torhorst were a couple of aggressive young men with a one-truck garage, lots of ambition and a dedication to give their customers the best job they knew how. Today, as QUALITY CARRIERS, INC., over 200 stainless steel tank trucks bearing the Quality name operate from a network of terminals to every corner of the U.S. east of the Rockies.

Lee Barney and Pat Torhorst have built Quality Carriers, Inc., into one of the finest liquid and dry bulk operations in the country. They did it through use of modern methods and equipment . . . and an insistence on living up to the name QUALITY in every phase of their far-flung operation.

Herman Pearce, Vice President and General Traffic Manager, puts it this way. "You don't try to cut corners on quality when your operation depends on the performance of your equipment. We've got 105 Mack Thermodyne® diesel tractors in our fleet, and we're adding more all the time. If a better truck ever comes along we'll buy it—but as of now, Macks are doing the job the way we want it done."

Take a leaf from the book of a successful carrier like Quality and put Macks to work hauling your perishable cargoes. For dependability and unmatched economy you can't surpass a Mack. The Mack branch or distributor nearest you will be glad to show you performance records of others who have found a profitable difference in Macks. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario. 8007

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TRUCKS

MACK
for over 4 straight years
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by far in sales of diesel trucks

CIRCLE 87 ON INQUIRY CARD

and color of these foods can be better protected by scavenger packets than by vacuum or gas packing.

► **Catalase:** This enzyme's highly specific action is shown by the following equation:

$$2H_2O_2 \xrightarrow{\text{Catalase}} 2H_2O + O_2$$

The greatest potential use for this enzyme is removal traces of hydrogen peroxide used to sterilize milk for cheese production.[12]

Reportedly, the peroxide-catalase treatment is superior to heat treatment at 65C. for 10 sec. so far as reduction of total bacterial count (particularly of coliform organisms) is concerned. The system is also superior to heat-treating of milk containing spore-forming organisms that produce proprionic and butyric acids.

Cheese made from peroxide-treated milk is reported to be as good as or better than that made from heat-treated milk.[13]

Liquid Formulations

► **Liquid Bromelain:** Now available as a stabilized liquid, this enzyme offers economic advantages over the powder form for chill-proofing, meat tenderizing, and manufacture of protein hydrolysates. Because fewer steps are required in its processing, it is less expensive than the powder.

The product is also of considerable interest in preparation of fish hydrolysates. In menhaden processing, its use simplifies oil extraction and enables producing a liquid protein with 50% solids.

► **Liquid Pectinase:** In liquid form, pectic enzymes permit processors to measure, rather than weigh, the quantities required. This not only saves time, but eliminates waste due to powder spillage. Moreover, costly scales or balances are no longer required in the processing areas.

This enzyme preparation is remarkably stable. After over a year's storage at room temperature there is no loss of enzyme activity. It is now available in products with exceptional heat stability for use in continuous hot-press applications.

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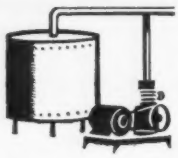

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YARWAY Y news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*

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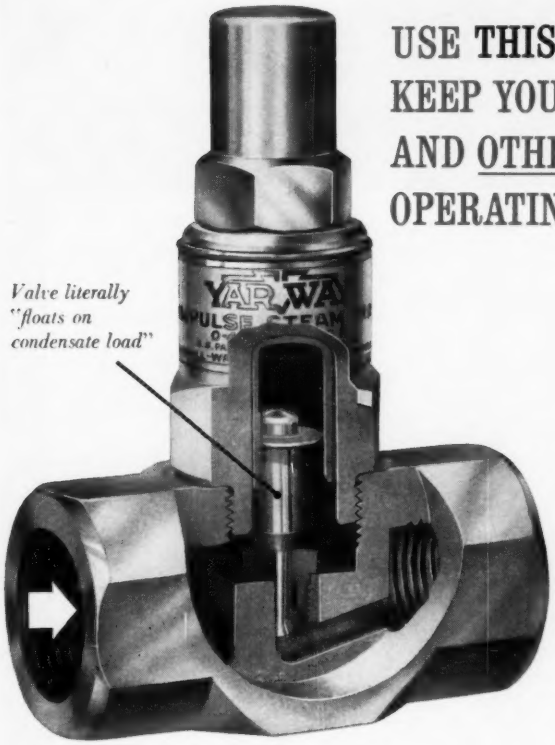


Valve literally "floats on condensate load"

USE THIS YARWAY STEAM TRAP TO KEEP YOUR DRYERS, COOKERS, TANK COILS AND OTHER PROCESSING EQUIPMENT OPERATING AT PEAK EFFICIENCY

Yarway Series 60 Impulse Steam Traps are the traps "designed with high production in mind." They get processing equipment hotter, sooner—and keep it hot. Here's how:

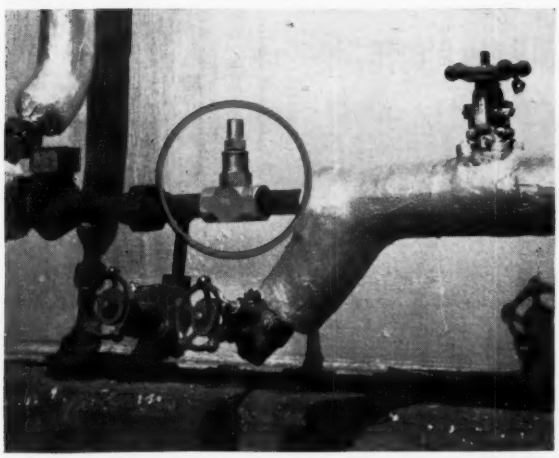
The only moving part, a small stainless steel valve, literally "floats on the condensate load." When equipment is started up, and condensate load is heavy, it opens wide and discharges at full capacity to bring equipment to operating temperature as quickly as possible.

In operation, it continuously senses condensate temperature, discharging each bit of condensate as it forms instead of storing up a bucketful. Result—higher temperatures, more even temperatures, more productive equipment.

Other Yarway features—small size, light weight, good for all pressures, low maintenance, stainless steel.

Yarway pioneered the impulse trap with its unique thermo-dynamic principle over 25 years ago. Most users find among Yarway's full line of impulse traps the profitable and productive solution to their steam trapping problems—you can too!

You can get Yarway's latest steam trap Bulletin T-1743, or a free 60-day trial of any Yarway Steam Trap, by writing Yarnall-Waring Company or contacting your local Industrial Distributor.



¾" Yarway Impulse Steam Trap draining tank coils on sulfur storage tank, 175 lbs. pressure

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AVERAGE CONDENSATE LOADS	EXTRA HEAVY CONDENSATE LOADS	LIGHT CONDENSATE LOADS
Series 60	Series 40	No. 30

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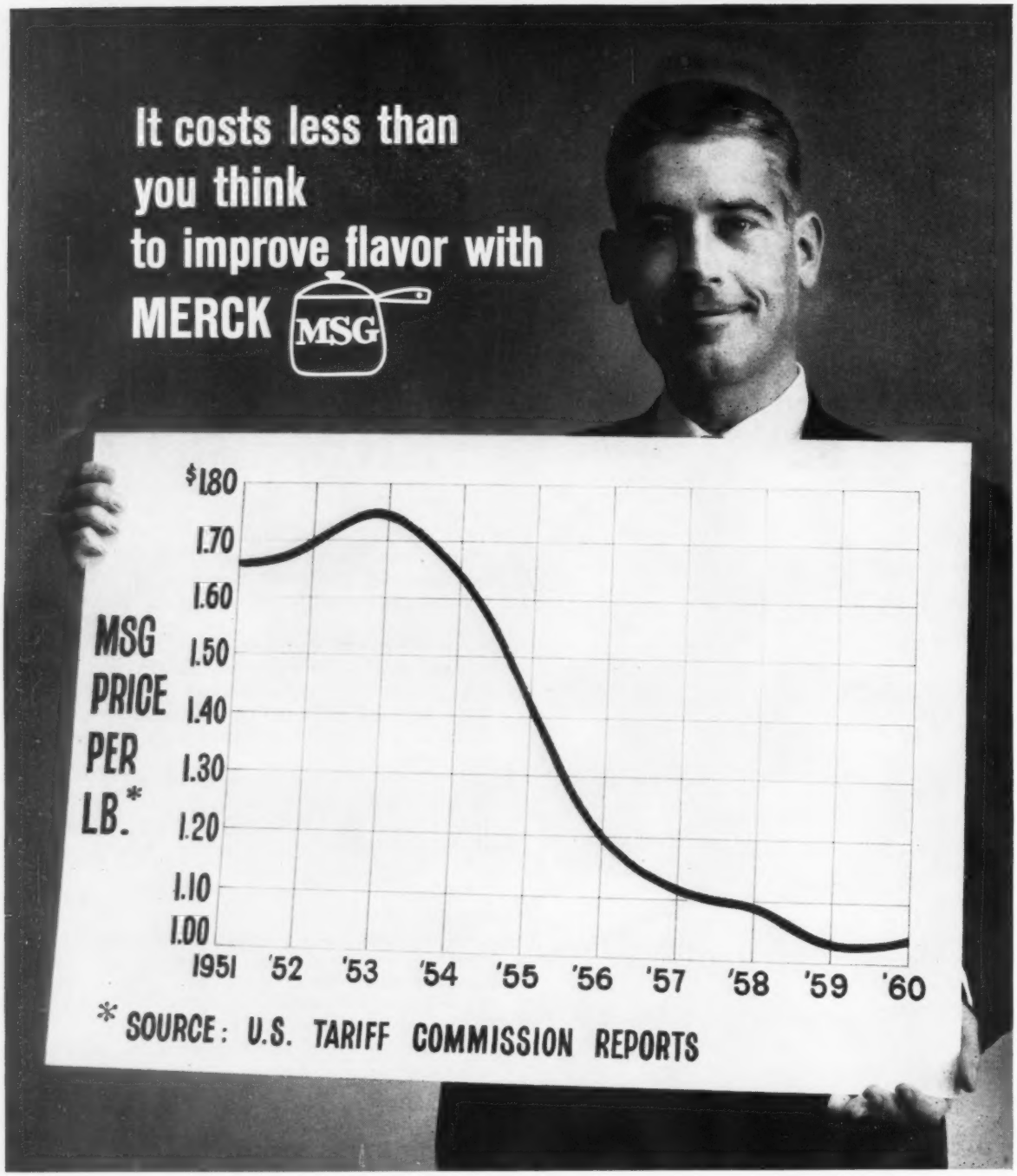


Has the cost of using MSG stopped you from improving the flavor of your products? Better take a new look at MSG economics as shown in our graph. While most food processing costs have sharply increased during the past decade, MSG has steadily decreased and leveled off.

At today's prices, your product can benefit from the addition of Merck MSG for only 1-2 mils per pound of finished product—little enough compared to the decade's high when MSG cost nearly twice as much.

When you decide to re-evaluate MSG for your product be sure to call Merck. Specialists in the Merck Food Laboratories are ready and eager to help you get the most from MSG. And a recent 100% increase in production capacity puts Merck in an excellent position to meet all your MSG requirements.

MERCK CHEMICAL DIVISION
MERCK & CO., INC. • RAHWAY, NEW JERSEY

Advances in Technology

Butter Characteristics Improved by Procedure

Two methods of making butter were studied. The control consisted of cooling the cream after pasteurization to 46F., holding at that temperature overnight (15 hr.), and churning next morning.

Experimental method consisted of cooling cream after pasteurization to 46F. and holding at that temperature for 2 hr. Then it was heated slowly to 66F. (heating time 1 hr.) with water in jacket of vat at 79F. This temperature was maintained for 6 hr. Cream was then cooled to 61F., held overnight (15 hr.), and churned next morning.

Experimental butter at 48F. was relatively soft and waxy with smooth spreading properties. The control butter was hard, crumbly, and sticky with poor spreading properties. Chilled wash water (40F. or lower) and low-temperature storage (below 0F.) aid in attaining and maintaining desirable body properties in butter.—*Jour. of Dairy Science*, 41-46, Jan. 1961.

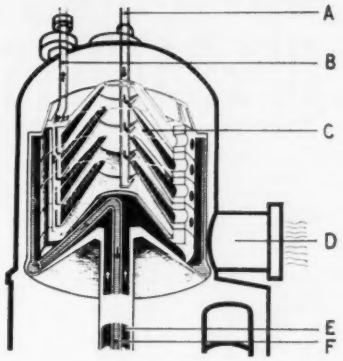
Bubble Mechanics Applied in Cake Quality Research

Finished-cake properties were compared with those predicted by theoretical treatment of properties of the batter which would affect the growth and movement of bubbles.

Surface tensions, viscosities, and yield values were measured in several white and yellow cake batters. Rates of bubble-to-bubble gas diffusion were observed in sequential photomicrographs of a single field of each batter. In batters prepared with unemulsified shortening, bubble-to-bubble diffusion was extremely slow, and leavening gas was evolved into only a small percent of the bubbles.

As predicted, when a given amount of gas is evolved into a small number of bubbles, a large proportion attain critical buoyancy and rise. These cakes had lower volume, indicating that a significant proportion of the gas was lost, presumably by this mechanism.

Where diffusion was more rapid and involved larger number of bubbles, volumes were higher. In a case where yield and viscosity values were high, even the tendency to layer (larger cells to accumulate nearer the surface) was minimized. — *Cereal Chemistry*, 294-305, May, 1961.



HEART of centrifugal evaporator is a stack of rotating conical heating elements. Principal parts are:
(A) Liquid to be treated.
(B) Paring tubes for concentrate.
(C) Heating Surfaces.
(D) Outlet tubes for evaporated liquids.
(E) Heating steam inlet.
(F) Paring tubes for condensate.

New Centrifugal Evaporator Concentrates and Sterilizes Heat-Sensitive Liquids

Using a new concept in evaporation, the centrifugal evaporator can concentrate and sterilize heat-sensitive liquids rapidly. Called "Centri-Therm," this evaporator has been introduced by Alfa-Laval Separator Co., Sydney, Australia.

In this evaporator, the problem of prolonged heating is eliminated by evaporating the liquid under vacuum and centrifugal force at 105-109F., so that complete concentration is achieved in just over a second. Fruit juice so concentrated has a naturalness of color, taste, and vitamin content never attained by any other method.

Heart of the Centri-Therm is a stack of rotating conical heating elements, creating by centrifugal force thin liquid films over the surfaces. By virtue of its design, this equipment evaporates a much greater amount of water/unit-area than a non-moving evaporator—and in a fraction of the time.

The Centri-Therm is suitable for small as well as large volume operations. Citrus juices with maximum amounts of pulp have been concentrated to about 65% and even 74% of dry substance with a constant capacity of 1,760 lb./hr. of evaporated water.

This unit can be used for deaeration, pasteurization and preconcentration. And it's ideally suited for fruit juices, coffee, yeast and malt extracts, pectin and sugar solutions, as well as many similar applications.—*Food Tech. in Australia*, 325-336, June, 1961.

Fungicides Cause Flavor Taint in Preserved Berries

Flavor and other changes due to the presence of four fungicides were estimated in simple syrup, strawberry puree made with the syrup, and canned strawberries and gooseberries. The fungicides were Captan, Karathane (Dinocap), Thiram, and lime-sulfur.

Captan at 5 ppm. increased corrosion of cans and gave a flavor taint at 2.5 ppm. or more. It was less noticeable in pureed strawberries. In canned fruit the effect was also less noticeable, though at 11 to 19 ppm. of Captan there was a taint. Gooseberries treated with Captan had no tainted flavor. Karathane at 10 ppm. was not detected in syrup, had no effect on cans, and was not detected in canned gooseberries and strawberries.

Thiram at 2 ppm. increased corrosion of cans and generally removed the tin. It also gave a tainted flavor to both syrup and fruit. Lime-sulfur at 10 ppm. caused

DUPLICATE BATCHING OPERATIONS

WITH THE NEW NIAGARA ELECTRIVOLUME METER

Brings automation to liquid processing. Set the pointer to the quantity of liquid desired and push the button. The meter takes over from there. It automatically measures and delivers the preset quantity, when the flow has stopped it resets the quantity, ready to duplicate the delivery cycle when the starting button is again pressed. It's as simple as that!

To change the quantity for a new formula, just turn the pointer to the gallonage called for and the meter is ready. Should an emergency arise, a stop switch is provided to shut off the flow at any point in the delivery cycle.

The Niagara Electrivolume Meter can be used to start or stop pumps, operate solenoid valves, signalling devices, electric relays and other processing equipment to make the meter the master control center for a complete series of operations. It can be used to actuate other Electrivolume Meters to automatically deliver other liquids in any desired sequence. There is virtually no limit to the extent which the Electrivolume Meter can be used to initiate and control process cycles.

If you formulate liquid components, the Electrivolume Meter will assure complete uniformity of product at lower costs. Write for complete information.

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Sales representatives throughout the nation

taints in puree in glass containers, very strong taints in frozen samples.—*Jour. of Science of Food & Agriculture*, 12, No. 3, 227-233, Mar., 1961.

Freezing-Defrosting Effects on Danish Pastry Freshness

Freezing and defrosting Danish pastry caused no appreciable loss of freshness. Nor did the pastry appear to be sensitive to limited variation in rate of freezing or defrosting. In this respect it resembled cake rather than the leaner types of yeast-raised rolls, such as dinner rolls.

At storage above OF., Danish pastry staled and firmed rapidly. A temperature of OF. protected the product from staling and firming for at least an 8-week period. Lower temperature offered no additional advantage.

Unpacked Danish pastry can be frozen without excessive moisture loss. Further moisture loss occurs slowly during frozen storage, so that it is inadvisable to store unpackaged products for more than a short time. Moisture losses during defrosting are great enough to require product protection during this process.—*Food Technology*, 273-275, June, 1961.

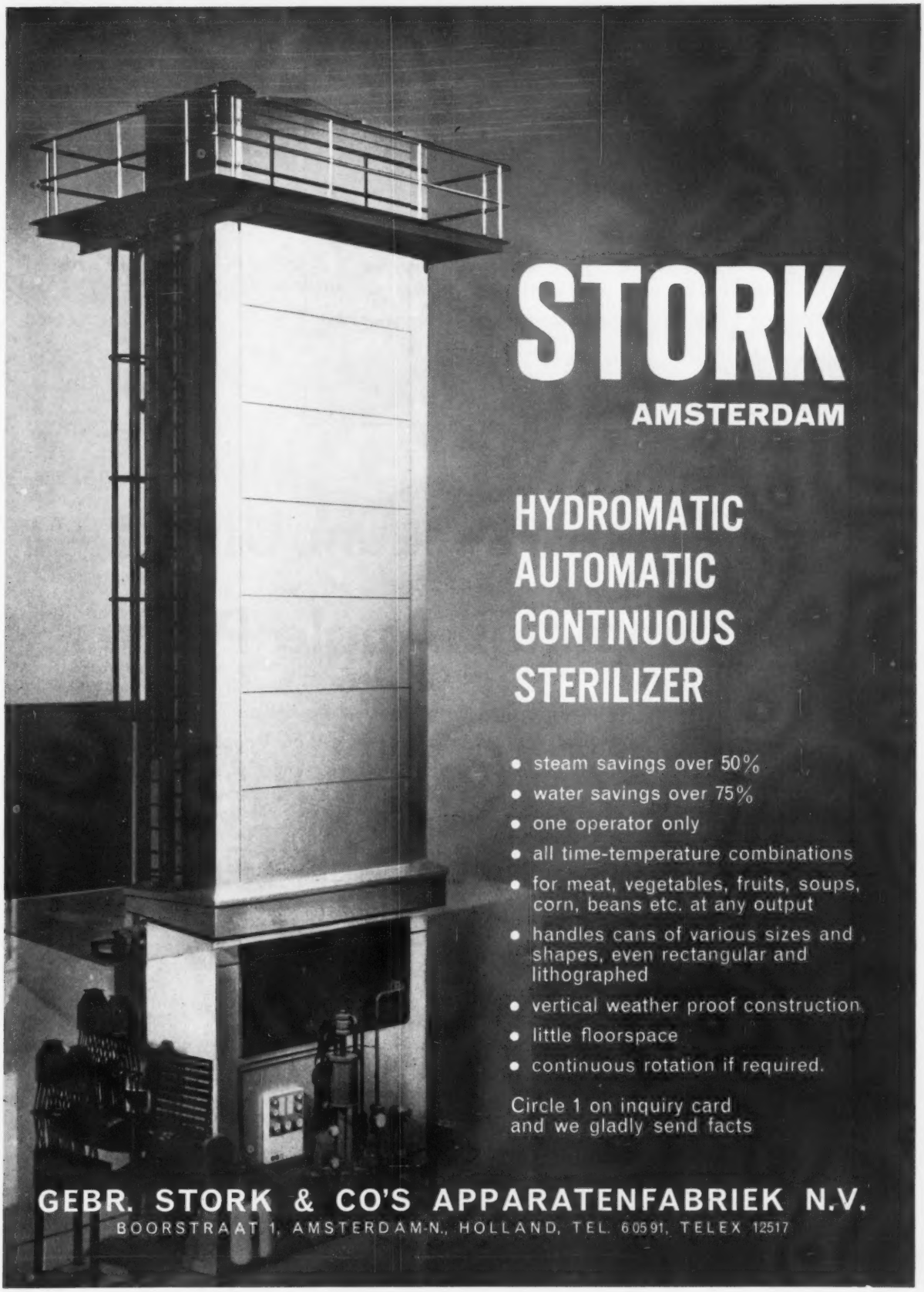
High-Frequency Effects on Stored-Grain Insects

Certain species of insects in stored grain can be killed by a few seconds' exposure to high-frequency electric fields, according to studies conducted at Manhattan, Kans., in 1956-57.

Differences were found in the resistance of various species, and between stages of a species. Treatment at a field intensity of 3.6 kilovolts/in., root mean square, in grain was more efficient in killing adult insects than treatment at lower field intensities of 2.4 or 1.2 kv./in.

Insects not killed by the various exposures were injured when exposed to high-field intensities. Most of the injured specimens died within a week after exposure.

The cost of treatment was estimated to range from 2.8 to 3.7 cents/bu. wheat. This estimate included depreciation and maintenance of equipment, interest on investment, power cost, and labor for operation and maintenance.—*U.S.D.A.*, Marketing Research Report No. 455.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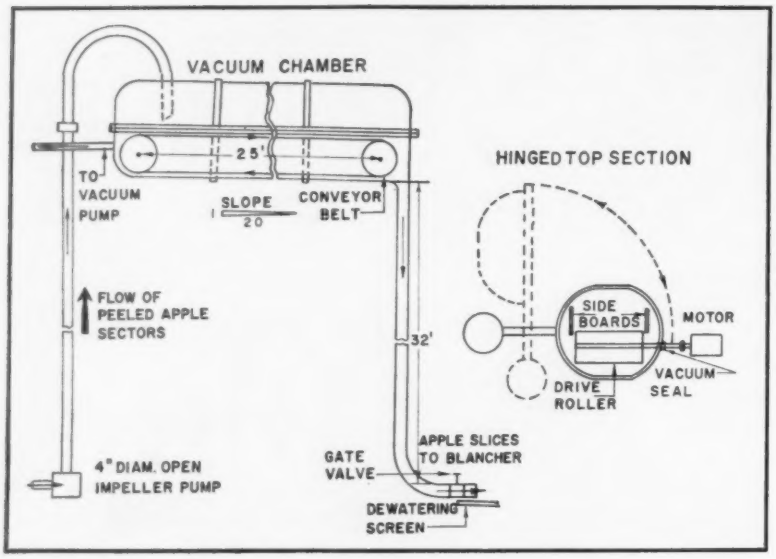

IN THIS vacuum treatment unit, peeled apple sectors are pumped up water-filled "leg" at left, move through vacuum chamber, and down right "leg" to blancher — without interruption.

Continuous Vacuum Unit Simplifies Apple Process

Simpler to operate than batch process, continuous unit offers several advantages to canners of solid-pack apples. Treated slices have firmer texture, too

PROVED SUCCESSFUL in pilot plant operation, a continuous vacuum treatment unit may readily replace batch processing in the canning of solid-pack apples.

Many canners of solid-pack apples and pie filling have previously adopted vacuum deaeration, followed by a steam or hot water blanch, as a means of removing gases from fruit tissue. In present Canadian operations, there are as many as eight vacuum chambers arranged to give a steady flow of blanched vacuumized slices to the fillers.

Each chamber, equipped with top and bottom gates, has an operating cycle as follows: (1) loading; (2) vacuum treating (10 min. at 27.5 in. vac.); (3) releasing vacuum with steam or hot water; and (4) unloading. Complex controls are necessary for all these units.

J. A. KITSON
Food Technologist, Research Station
Canada Dept. of Agriculture, Summerland, B.C.

New Method's Advantages

The new continuous process is automatic and should require no operator after start-up.

A single vacuum gauge and belt-speed controller-indicator are the only instruments required for the new equipment. In contrast, eight or more sets of vacuum-pressure gauges, gate valves, timers, steam and vacuum controls are required on the large-scale batch system units.

In the batch process some crushing of apple tissue at the lower end of vacuum chambers may occur. This is caused by pressure from the weight of fruit on top. In the continuous operation there is no build-up of fruit beyond a one foot depth on the belt and hence less chance of crushing.

Vacuum pump capacity required for the continuous process is much lower than for the batch process since vacuum in the chamber is never broken during a continuous run. Further, the pump need only remove gases from apple tissue and water once the equipment is operating.

After leaving the vacuum equipment the slices enter a blancher where water is taken up by the apple tissue to yield a translucent slice similar in appearance and texture to pineapple. The volume of blanch water remains reasonably constant, the only loss being that taken up by the apples. If a sweetened solid pack is desired, the vacuumized slices may be blanched in hot syrup.

Slices processed by the new method have a firmer texture than those prepared by the batch process (Table 1).

TABLE I. Pretreatment Effect on Texture of Canned Solid-Pack Apples*

Pretreatment	Tenderometer Readings** (5 Samples)
Cont. vac. process 6 min. @ 27.5 in. vac. release with 60 F.–water. Immerse in 210 F.–water. Hold 3 min.	33.65 22.15 28.60 36.90 33.15
Ave.	30.89
Vac. process 6 min. @ 27.5 in. vac. release with 210 F.–water. Hold 3 min.	23.35 19.50 23.10 26.75 29.90
Ave.	24.52

* 20 oz. (307-409) cans processed 15 min. at 210F.
** Average of 2 tenderometer (scale 1) readings on each sample. Tenderometer operated with large weight removed.

Simplified Process

The unit for continuous automatic vacuum treatment (see drawing) consists of a vacuum chamber above two water-filled "legs" 32 ft. in height. The legs form vacuum seals when the device is operating. Peeled apple sectors are conveyed up the incoming leg by an open impeller food pump. They are discharged onto a balanced weave wire mesh conveyor belt in the vacuum chamber. Here the water on brine used as a transfer fluid is separated and flows beneath the belt to the outgoing leg.

Vacuum treatment time may be adjusted by varying the belt travel speed. With apples the required treatment times range from 5 to 15 min. depending on the variety and maturity of fruit. (A treated apple sector should appear translucent after blanching if the vacuum treatment has been sufficient.)

After treatment, on the belt conveyor, sectors are discharged into the outgoing leg, and carried to the bottom end with the outflowing water. Here the treated sectors are separated from the circulating water and transferred into a continuous hot water (210F.) blancher prior to canning as solid-pack slices or mixing with spice and thickened syrup for pie filling.

Equipment Specifications

The following specifications are suggested for a commercial unit designed to process 10,000 lb. of apple tissue/hr.

A 4-inch open impeller food pump powered by a 16 H.P. motor will be required to circulate 150 gal. of water containing approximately 166 lbs. of apple slices/min. Dimensions of the conveyor belt in the vacuum chamber may be varied. The drawing shows a 24x24-ft. belt which, if loaded one foot deep, would carry 10,000 lb. of apple sectors/hr. through a 10 min. vacuum process. Since the time required for complete vacuum treatment of apple sectors may range from 6 to 15 min., the unit's capacity would vary accordingly.

The vacuum chamber for a 2-ft. wide belt should be 2 ft. 8 in. in diameter and approximately 28 ft. long. Access to the conveyor belt for cleaning and servicing can be provided by building the vacuum chamber in two halves with a removable top.

Additional applications. The continuous vacuum process may be applied to products other than apples. An example is fresh pack cucumber chips. In this case the hot blanch water is replaced with a hot pickling brine.

Acknowledgment: Appreciation is expressed to Annapolis Valley Canners Ltd., Hantsport, N.S., for providing some equipment for the pilot unit and to Mr. G. Strachan, C.D.A. Research Station, Lethbridge, Alta., for making texture readings on canned apple samples.

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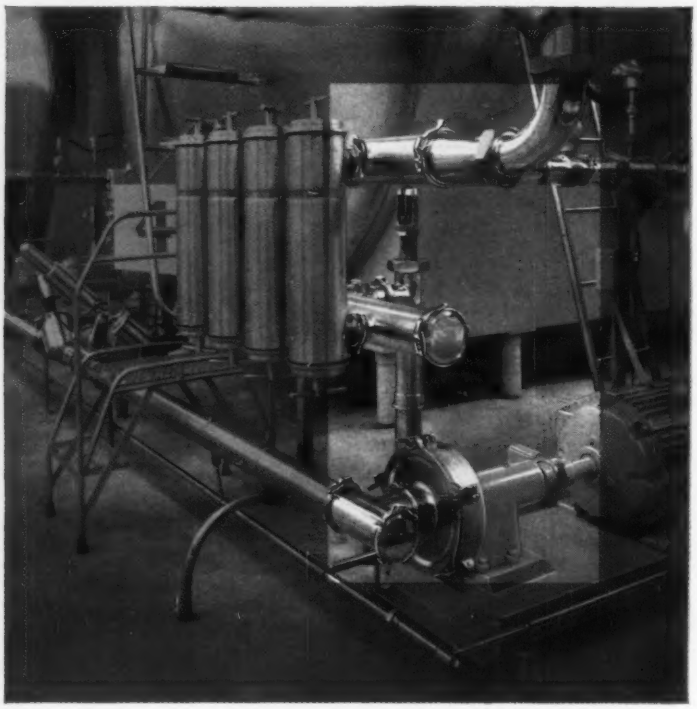
TRI-CLOVER EQUIPMENT* SERVES Pepsi-Cola

Close-up of two Tri-Clover Stainless Steel Compression Valves and one of the Fesco Air Actuated Valves serving one of four 15,000-gal. syrup tanks in this modern Pepsi-Cola plant. These are the largest tanks of their kind in the beverage industry.



Tri-Clover Sanitary Centrifugal Pump and Fittings installed in the Pepsi-Cola manufacturing plant in Long Island City, New York.

* *Air Actuated Valves*
Centrifugal Pumps
Tri-Clamp Fittings
Compression Valves

TRI-CLOVER
LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

Wherever it's bottled, the consistent high quality of Pepsi-Cola syrup is a prime factor in maintaining the uniform standards and taste of the final product.

To help assure product uniformity and high operating efficiency with low maintenance, Pepsi-Cola Company of Long Island City, New York, relies on Tri-Clover Division's Compression Valves, Tri-Clamp Fittings, Centrifugal Pumps and Fesco Division Automatic Valves.

For in this Long Island manufacturing plant, as in so many other modern beverage, dairy and food processing plants, users have found that Tri-Clover products constantly guard against product contamination and at the same time provide quick, positive control of syrup or other liquid flow and years of reliable service with low maintenance costs.

For further details about these and other Tri-Clover products, see your nearest Tri-Clover distributor.

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IN CANADA: Brantford, Ontario
EXPORT DEPARTMENT: 8 South Michigan Avenue, Chicago 6, Illinois Cable TRICLO, CHICAGO

DAILY REMINDER is this eloquent "Best Deal" safety sign (from National Safety Council) located at plant exit. Graphic posters and ingenious devices such as message on mirror above time-clock help keep Carling personnel safety-conscious. Mirror tells employees: "YOU are looking at the person who can make or break our Safety Record."

Accidents Take a Vacation

. . . at Carling's Frankenmuth brewery, which passed five consecutive year mark without a disabling injury. Here's how Michigan plant wins safety-perfect honors

OUTSTANDING SAFETY RECORDS don't just happen. They result from regular practice, alertness, perseverance, and good teamwork.

That's the feeling of officials at Carling Brewing Co.'s Frankenmuth, Mich., plant, which boasts one of the finest safety records in U. S. industry—over five consecutive years without a disabling injury.

"We talk safety and almost preach safety to our employees both on and off the job," says Herbert Naegele, safety director for the 240-man plant. "But," he adds, "we wouldn't have been able to accomplish this record of over 2 million safety-free man-hours without the fine cooperation we have had from our employees and their families."

In '52, the Frankenmuth brewery had 125 employees and an accident frequency rate for that year of 20.24. Plant's safety program began in '53 and showed immediate results. In '53, rate dropped to 17.03, in '54 to 12.42, and plummeted to 2.92 in '55. From '56 through '60, it was a satisfying zero.

Stress Teamwork

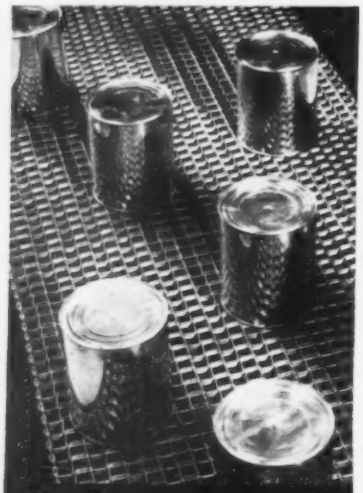
Concept of safety teamwork was inaugurated at the outset of plant's concerted program. All plant departments were divided into separate safety teams, each with its own committeeman.

"The biggest single factor in the success of our program," reports safety chief Naegele, "was the development of a safety attitude on the part of both supervisory personnel and employees. We have been successful in bringing our people to realize that safety promotion efforts are strictly for their benefit. And it's for the benefit of their families who, first of all, don't want Dad to hurt himself; and, secondly, can use all the dollars in a full paycheck."

Various techniques are used to promote safety. Here are a few: ► **In the original safety program "competition"** names of

LA PORTE

FLEXIBLE STEEL CONVEYOR BELTS



Handle raw, processed and packaged food safely and economically

THE flexible open-mesh design of LaPorte Belts offers definite money-saving advantages to food manufacturers. For example, fruits and vegetables cannot roll off. Sorting, grading, washing, canning, dehydrating and freezing are speeded up. The impenetrable surface, that resists oils, grease and detergents, safeguards products against off-flavors and odors. In addition, these temperature-proof belts maintain a perfectly flat surface on filling and sealing tables. Easily sterilized with a steam gun while in motion.

If you process, package, store or ship food, it will pay you to use LaPorte Belts. Available in ½" x 1", or 1" x 1" in any length and practically any width. Ask your mill supplier or mail coupon for illustrated literature and prices.

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Please send free literature on your Conveyor Belt.

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CELEBRATE FIVE SAFE YEARS: Several hundred Carling employees, their families, and area residents gathered in front of the Frankenmuth plant late last year to celebrate the brewery's fifth consecutive year without a disabling injury.

safety team members were placed in separate hats according to a particular phase of safety assigned to that team. One name was drawn by the team committeeman who asked a safety "Question of the Month" relating to that phase of the program. Contest winners received such items as cigaret lighters, pencils, cigars, and other gifts.

► **Safety contests are also conducted** for plant's three main departments—brewing, engineering, and bottling. Plaques are awarded for the best records during the year.

► **Meetings are conducted at least once a month.** Team members report unsafe practices or working conditions evident during the plant. Steps are then taken to correct these hazards.

► **Posters, literature, and other printed materials** are prominently displayed throughout the plant. These are supplied by plant's insurance carrier, the National Safety Council, U. S. Brewers Foundation, Michigan Dept. of Labor, and other sources.

► **Communications are a vital part of the program.** This includes monthly safety feature articles and photographs in "Carling Frankenmuth News," the employee publication, and letters to employees' homes, films, safety slogan contests, Christmas parties, picnics, and safety victory celebrations.

► New employees receive a thorough indoctrination in safety and what is expected of them to keep themselves and their fellow workers safe from accidents.

► Modern protective devices, including extensive machinery guard equipment are utilized at the Frankenmuth plant.

► Monthly supervisory meetings are held to insure proper teamwork and good relations between management, supervisors, and employees.

Impressive Trophy List

Of course, the Carling Co. as a whole makes a continuing effort to emphasize safety among its six plants and recently announced initiation of a second plant-wide award. Named the Safety Improvement Award, it will be presented annually to the Carling plant which showed the greatest reduction in accident rate compared to the previous year.

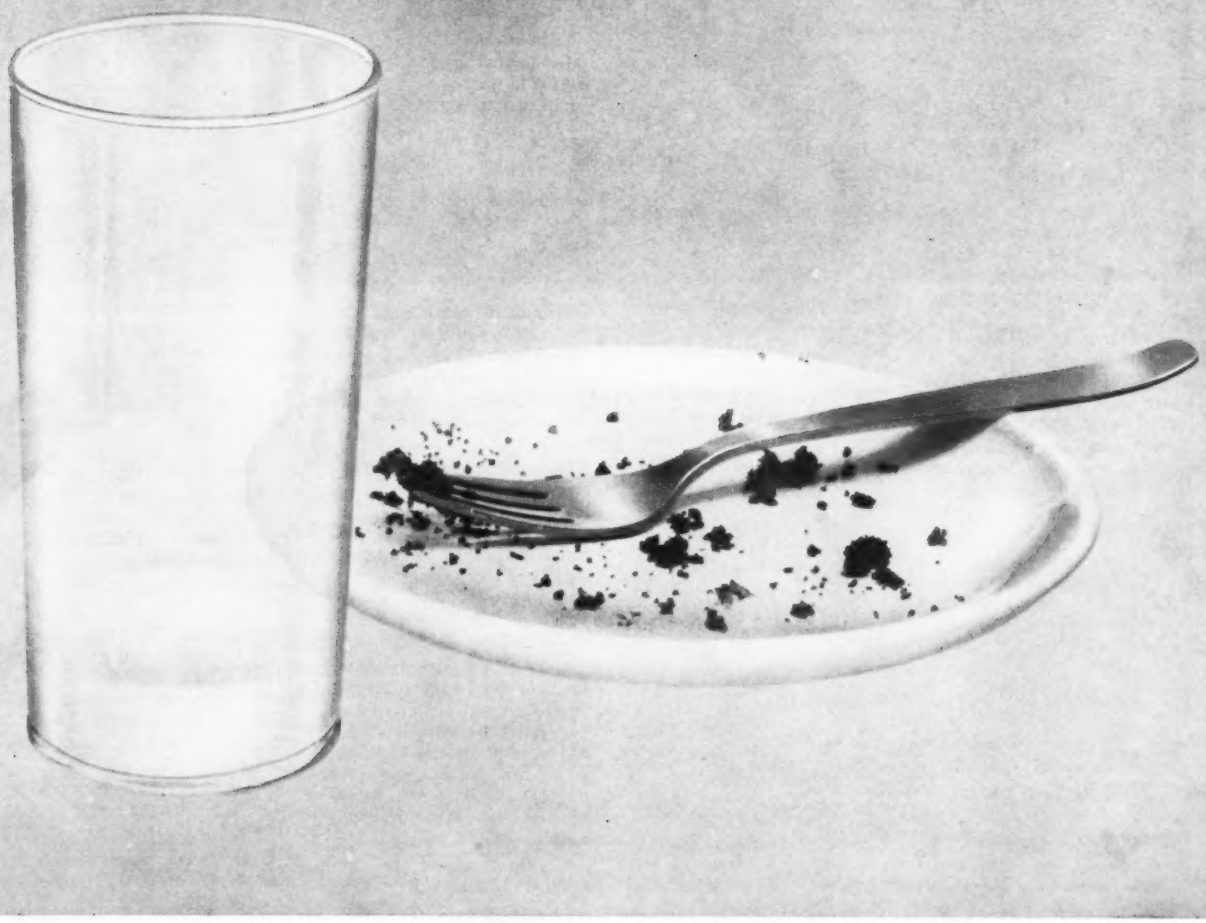
Previously, Carling augmented its safety program with the presentation of the President's Cup to the plant with the lowest overall accident rate based on the number of man-hours worked. The Frankenmuth plant has been the recipient for the past three years.

Other safety honors awarded to Frankenmuth include five Awards of Merit conferred by the National Safety Council, six first-place awards in NSC contests, one NSC Achievment Award for prevention of injuries resulting from falls, five United Brewers Foundation first-place trophies, one award from USBF for safest plant (exclusive) for delivery, three Aetna Casualty & Surety Co. trophies, and four other Carling inter-plant awards. **(FE Staff)**

a little cmc makes a big difference

It looked tasty in the bakery—it lived up to its looks at home. That's why it disappeared fast. And a little Hercules Cellulose Gum, purified CMC, made the big difference. But even if the cake had lasted longer, the icing—and the cake itself—would have remained fresh and tasty, because they both contain a little cellulose gum. It makes a big difference in icings. It prevents "weeping" and also retards crystal growth, keeping the icing surface smooth and velvety. For real "frosting on the cake," see the difference a little cellulose gum can make.

For complete details write to Hercules.



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Men & Companies

B. M. Hagan

New GM Div. . . . General Mills has established a new Refrigerated Foods Div. with B. M. Hagan, company v.-p., as general manager.

GM has been in refrigerated foods since '56 when the company acquired Ready-To-Bake Foods, Inc., Los Angeles. The business has been operated as part of the firm's Grocery Products Div. C. H. Bell, GM president, says that a separate division will make it possible to provide specialized management and operations tailored to the refrigerated and related markets.

Mr. Hagan, v.-p. and division general manager, has named D. C. Maughan and T. P. Gilsenan to posts of assistant general manager and comptroller, respectively.

Products of the division include both Betty Crocker and Puffin brands of buttermilk and homestyle biscuits, and Betty Crocker brand pizza mix, raspberry Danish sweet rolls, butter twist, and all-butter dinner rolls.

Dr. Delbert Doty

AMIF Boosts Doty . . . Dr. Delbert M. Doty has been named American Meat Institute Foundation's director of research and education.

In his new assignment, Dr. Doty has assumed administrative direction of an institution which has won international acclaim for the contributions it has made in scientific research, particularly in the fields of microbiology, biochemistry, nutrition, organic chemistry, and food technology.

Dr. Doty has been a member of the AMIF staff since '48 and an associate director of research and education there since '56.

Dr. Charles F. Niven, Jr. is the new scientific director of the organization.

Gordon Ellis

Heads New Pet Div. . . . Gordon Ellis, former executive v.-p. and general manager of Pet Milk Co.'s Food Products Div., has been named president of the division.

Mr. Ellis joined Pet over 20 years ago and has held positions in sales, advertising, merchandising, and marketing. He was made marketing v.-p., Food Products Div., in '59 and executive v.-p. and general manager in '60.

The Food Products Div. is responsible for production and marketing of Pet Milk Co.'s evaporated milk products, dry milk products, frozen foods, and dietary foods.

Personnel

E. F. Fitzmaurice, general manager of Perkins-S.O.S. Div. of General Foods, and **E. W. Kelly,** Birds Eye Div. general manager, have been promoted to v.p. posts.

Walker R. Goodrich has been elected personnel v.p. at Seeman Bros. Inc.

James S. Fish, v.-p. and advertising director at General Mills, has been elected to the executive committee of the Advertising Federation of America.

Paul Smucker takes over as president of J. M. Smucker Co., Orville, O., jam and jelly manufacturer.

Howard L. Stier is now director of quality control at United Fruit Co.

William E. Klein, former product manager for Morton Frozen Foods Div., Continental Baking Co., takes over as director of sales and marketing.

George M. Loeffler, operations v.p. at the Nestle Co., retired after 40 years service with the firm.

Mortimer D. Moriarty has been named general manager and operating head of Good Humor Corp.

Industry

Borden Co. has opened a new powdered milk packaging plant in Mallow, County Cork, Ireland.

Diamond Crystal Salt Co. has acquired **Unit Packet Corp.,** pioneer developer of individual service containers for salt, pepper and other condiments.

Armour & Co. plans a food research laboratory and pilot plant in Oak Brook, suburban Chicago, where 100 scientists and technicians will work to develop new and improved meat, dairy, poultry, and shortening products.

Francis H. Leggett & Co., wholly owned subsidiary of **Seeman Bros. Inc.,** has purchased a plant and facilities in Sodus, N. Y., formerly operated by the **Silver Shore Cooperative, Inc.,** for an undisclosed cash sum.

Chili Products Corp., Ltd., Los Angeles, world's leading processor and dryer of chili peppers, has been acquired by **Red Star Yeast & Products Co.** and will operate as a division.

The Frito Co., Dallas, and **H. W. Lay & Co., Atlanta,** have agreed in principle on plans to consolidate the two firms under the name, **Frito-Lay Inc.,** with headquarters in Dallas.

The Liberty Cherry & Fruit Co., Inc., Covington, Ky., has merged into **Beatrice Foods Co., Chicago.** Firm will operate as separate division of BF.

Associated Industries

Package Machinery Co. announces a newly organized department of foreign operations.

Kearns & Smith Spice Co., Chicago, has merged with Archibald & Kendall Inc., New York.

Plax Corp., leading producer of blow-molded plastic containers, starts construction of its newest plant in Yardville, N. J.

Chas. Pfizer & Co. has signed contracts for acquisition of assets and business of New England Lime Co. in exchange for approximately 300,000 shares of Pfizer common.

Dr. Carl E. Barnes has joined FMC Corp. as research v.-p.

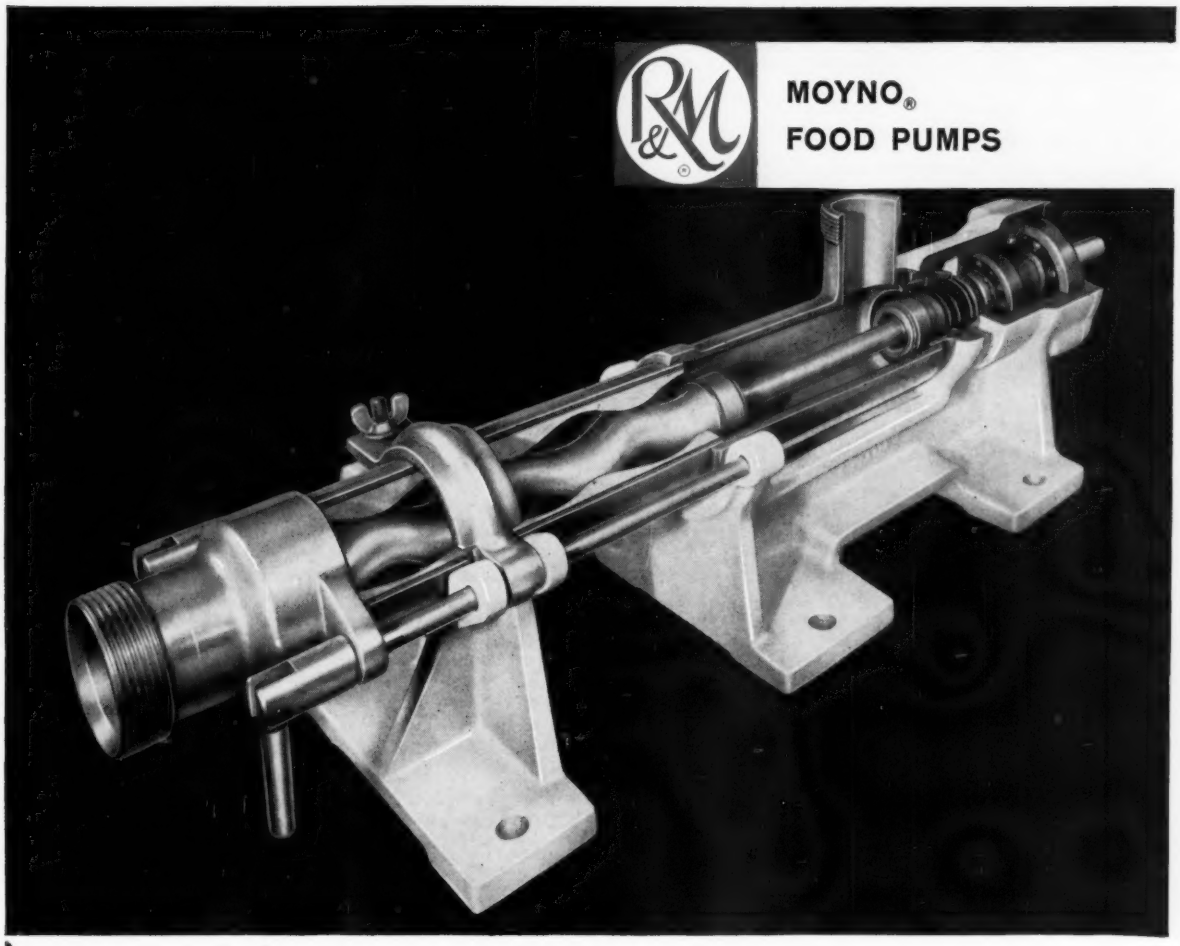
T. F. Ronson, Fred D. Pfleiing Co. v.-p., has been reelected president of Bakery Equipment Manufacturer Assn.

Dobeckmun Div. of The Dow Chemical Co. plans to place future emphasis on a more thorough program of package development and service to the food distribution market.

Deaths

Lester Janes, v.-p. and finance director of Gerber Products Co.

John L. Ryon, 67, v.-p., board member, and executive committee member of International Salt Co.



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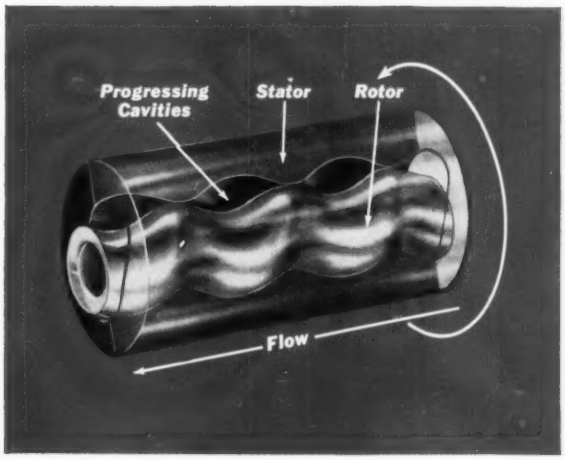
On each cycle, this Moyno smoothly pumps 4 oz. of shrimp and tomato sauce into a jar. Moyno's "progressing cavities" keep the shrimp whole and never toss the sauce! Just as easily Moyno Pumps move all foods, ranging from thin soup to heavy peanut butter, without disintegration, pulsation, aeration or agitation. Their smooth rotor-stator contours can't lodge particles where bacteria might thrive, so food stays pure. And Moynos can be dismantled, thoroughly cleaned and reassembled in minutes. All wettable parts except stator are stainless steel. Stator can be stainless, synthetic rubber, bakelite or other material. Moyno Food Pumps are available in five sizes with capacities to 175 gpm and pressures to 75 psi. Write today for new Bulletin 100-FE



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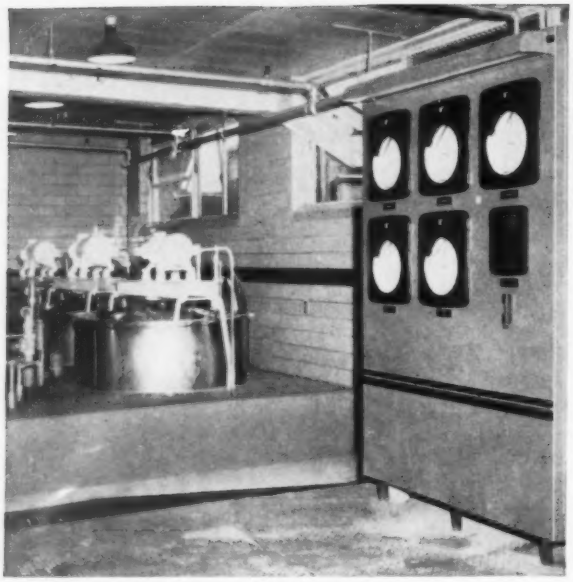
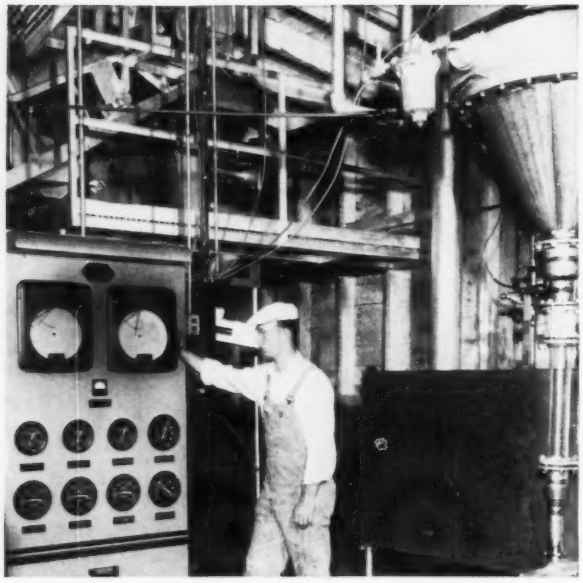
Propellair® Industrial Fans • R & M-Hunter Fans and Electric Heat • Trade-Wind Range Hoods and Ventilators
Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.



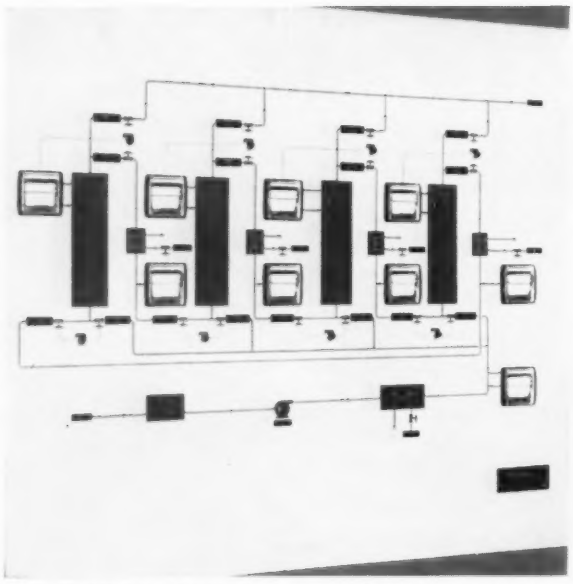
MILK PROCESSOR – TENNESSEE Foxboro 6-instrument cabinet controls milk fore-warmer temperatures with Dynalog® Electronic Instruments. **2-, 4-, or 6-instrument cabinets** can be installed individually, or in combination — provide complete centralized control of any food process, large or small.



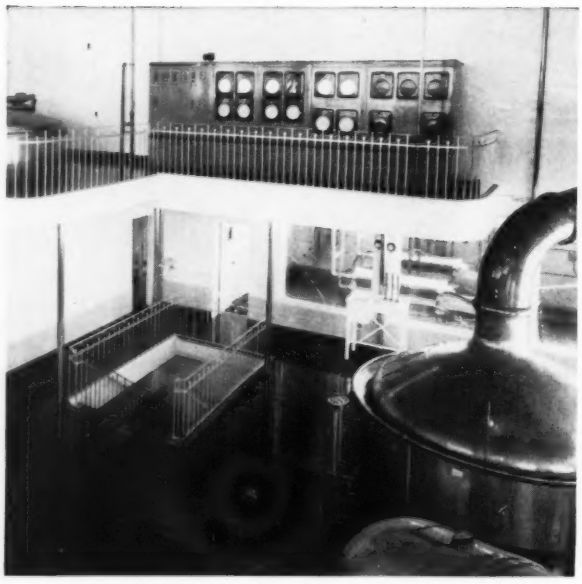
FOOD PACKER – CALIFORNIA Automatic control of process evaporator is easily handled from the Foxboro cabinet. Integrated control system, specifically designed for the process by Foxboro, assures perfect quality and flavor of concentrate. **Grouping of related controllers and indicators** results in easier operation, simpler maintenance.

For any food plant –

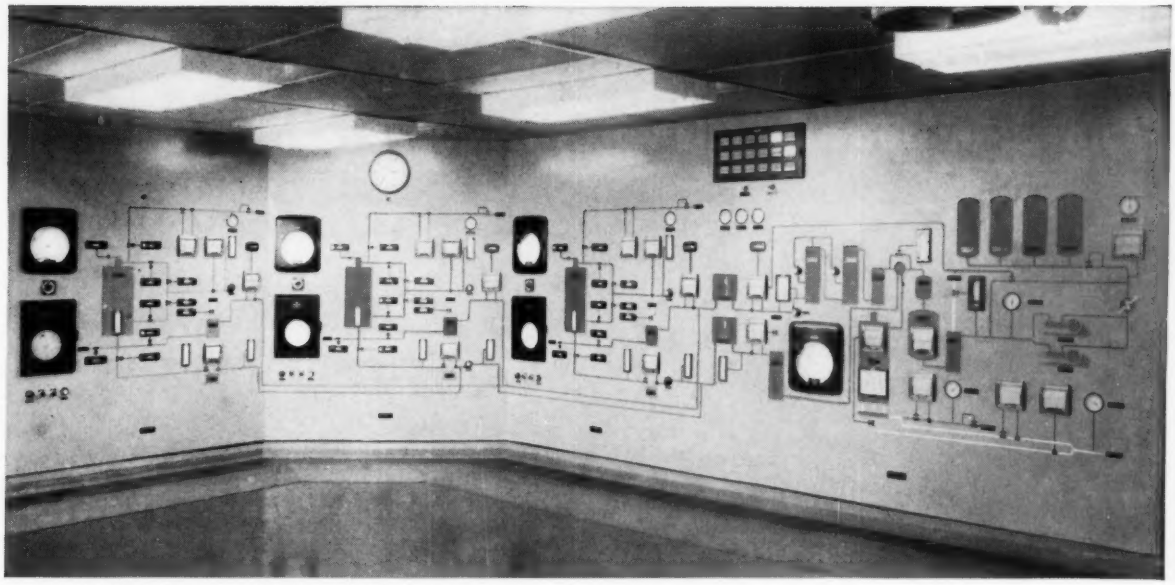
an integrated Foxboro



COFFEE PROCESSOR – NEW YORK This centralized control panel has its graphic diagram painted on a formica plastic background, permitting easy modification of the diagram should process changes occur. **Painted formica panels** are only one of several types of graphic control panels available from Foxboro.



BREWERY IN MEXICO Complete Foxboro centralized control system simplifies operation of rice and mash cookers, hot and cold water tanks, lauter tubs, and brew kettles. Air tubing is neatly formed and fitted to permit easier servicing and maintenance. System was designed and assembled in Foxboro, Mass. — shipped in sections for installation in Mexico.



VEGETABLE OIL REFINERY — ILLINOIS Complete control of hydrogen generation units is accomplished from this graphic panel. Small-case Consotrol* Recording-Control Stations are installed right in the process diagram — linked to their appropriate measurement and control points by colored lines — resulting in easier operation and better process supervision. **All back-of-panel connections** are plainly marked for quick and easy identification.

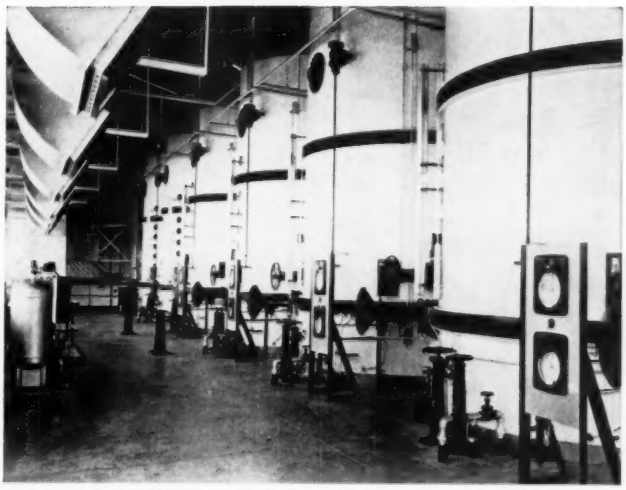
for every food process

Packaged Control System

Complete packaged control systems providing centralized operation from one convenient location! It's the trend that's streamlining the efficiency of food plants today.

Foxboro custom-engineered packaged control systems make it easy. Years of application engineering experience insure that instruments are exactly suited to your process — shipped already mounted in cabinets or panels, completely piped and wired. Only power and process connections are needed to put them into operation. This simplified installation, plus the operating convenience and low maintenance of these custom-engineered control systems keep cost at a minimum.

Full details on Foxboro Packaged Control Systems are now available in a new illustrated bulletin. It contains complete information on the design and construction of cabinet and panel units . . . as well as Foxboro's rigid requirements for high quality piping and wiring. Write for it today. The Foxboro Company, 309 Neponset Ave., Foxboro, Massachusetts, U.S.A. *Reg. U.S. Pat. Off.



SUGAR PLANT — CALIFORNIA Local control for these vacuum pans is provided by individual panels for better operator supervision. Heavy gauge steel panels protect instruments and accessories from accidental damage.

FOXBORO
REG. U.S. PAT. OFF.

INSTRUMENTATION FOR THE FOOD INDUSTRIES

MORE THAN A SUBSTITUTE

HERE'S ONE THAT'S BOTH FISH and FOWL

Here's an ingredient that gives you *everything* in the way of clearer, cleaner, better flavor for fowl and sea food products – new Maggi's Hydrolyzed Plant Protein 3H-3.

A *basic* flavor, always uniform, unaffected by processing and unusually economical, Maggi's 3H-3 never varies in taste or quality, has been proved by leading processors.

Like the entire Maggi's Hydrolyzed Plant Protein series – for beef, veal and pork, too – 3H-3 makes a marked contribution to the desired flavor without adding other flavor characteristics.

The technologists who developed these unique Maggi's Hydrolyzed Plant Proteins are available to assist you in your formulations. Write for free samples and data.

FOR VEAL and PORK

Maggi's Hydrolyzed Plant Protein 3-H1 is designed particularly for use in veal and pork products. Clear and clean as well, it provides a medium-strength meaty background and is light in color.

FOR BEEF FLAVOR – MAGGI's 4-BE and 4-BE-2
Available in Liquid, Paste or Powder form

MAGGI's®
HYDROLYZED PLANT PROTEINS

Prepared by the makers of world famous MAGGI's® *seasoning*

THE NESTLÉ COMPANY, INC.
WHITE PLAINS, N. Y.

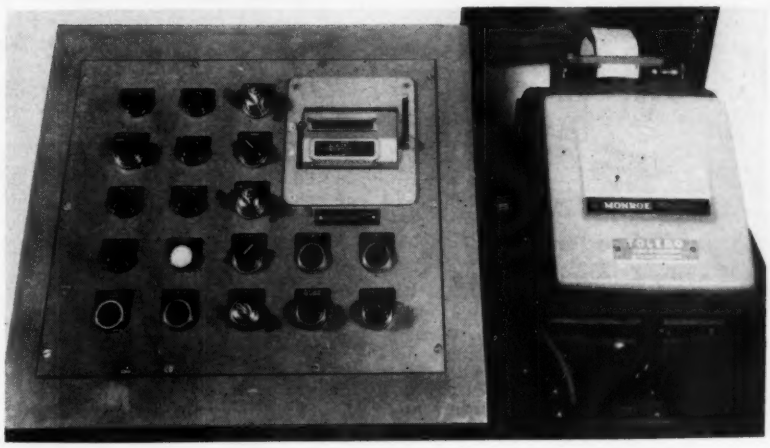
new equipment & supplies

Polypropylene Filter Cloth

A new polypropylene filter fabric, woven from filament warps and staple fillings, combines superior cake-release characteristics with abrasion resistance and resilience.

Called 9000 Series, fabrics are designed for use in plate-and-frame presses, rotary vacuum filters, and dust collectors. They are termed particularly suited to hot, corrosive service involving separation of gelatinous precipitates and fine or abrasive dusts. — *Technical Fabricators, Inc., Nutley, N. J.*

Circle 401 On Inquiry Card



Offers Fast, Accurate Bulk Weighing

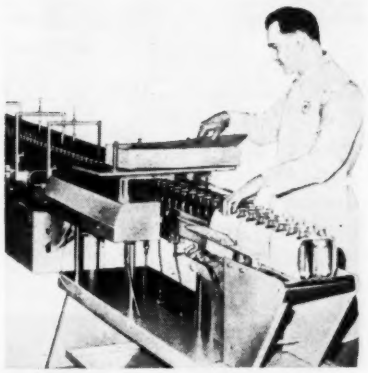
Handling almost any bulk material which can be automatically conveyed, this weighing system offers rapid operation and accuracy of 1 part in 4,000. Moreover, its space-saving design reportedly can save up to 25% in structural costs.

In operation, a pre-set draft counter enables scale operator to select the number of drafts required. System stops automatically when predetermined number of drafts have been weighed. Both gross and tare weights of each draft are recorded by an automatic adding machine. And total net weights of these accumulations are always available.

Fail-safe design and functional electrical interlocking provide accurate recording. Since the scale is read automatically, human errors are prevented and the operator has free time to perform other duties.

Six models with capacities to over 3 million lb. per hr. are available.—*Toledo Scale Corp., Toledo, Ohio.*

Circle 402 On Inquiry Card



Wrap-Around Packager

Offering wrap-around multiple packaging of cans or bottles at speeds to 20 packs per min., this semi-automatic machine can easily be integrated into any production line operating at speeds to 120 bottles or cans per min.

Placing the carton blank is the only manual operation involved. Unit (Compact 20) is specially suited to multi-packing of non-returnable bottles and cans, market testing of consumer multi-packs, and distributor packaging of cans, bottles, jars, and aerosols.

Packager takes 75x24x44 in. of space. It handles cartons from 4¼-8¾ in. long and from 4¼-6 in. wide.—*Continental Can Co., Folding Carton Div., New York City.*

Circle 403 On Inquiry Card

Caster Wheels Have Long-Wearing Tread

Now available are caster wheels with a new long-wearing, high-load capacity tread of a polyurethane elastomer called Adiprene.

This tread has a resiliency that absorbs vibrations and rolls quietly, yet permits easy starting and rolling. It is not affected by mild acids, alkalis, or weathering, and does not mark floors or pick up concrete particles.

Wheels are available in both swivel and rigid-model casters. Diameters range 3½-8 in. with

SERVICE CENTER

Ingredients	120
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Reader Inquiry	Back of Book

load ratings of 400-1300 lb.—*Rapids-Standard Co., Grand Rapids, Mich.*

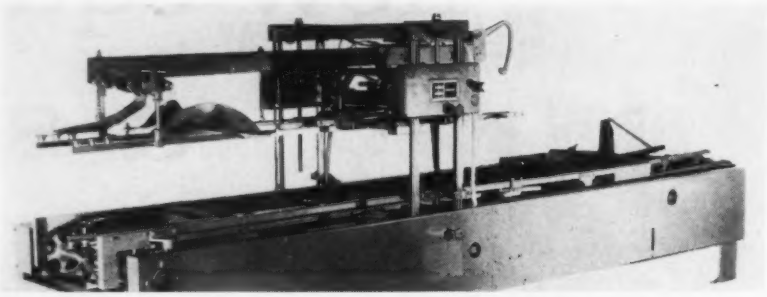
Circle 404 On Inquiry Card

Sonic Homogenizer Is Easily Cleaned

Five minutes is all it takes to completely disassemble this sonic homogenizer for cleaning.

Called Rapisonic Mark V, it handles foods with viscosities varying from that of liquids to semi-pastes. Capacities range 2-4 gpm. to 15-20 gpm.—*Sonic Engineering Corp., Stamford, Conn.*

Circle 405 On Inquiry Card



Case Gluer Offers Many Advantages

Lower glue consumption, neater cases, and simplified plant housekeeping are advantages cited for this case gluer.

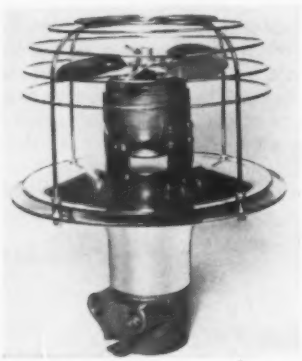
Called Type SK-455, it applies glue in uniform stripes instead of solid coatings. Neater cases result from a case-controlled skip-gap pattern of application that prevents glue from dropping through the slots onto the product. Plant housekeeping is simplified because the unit does not spatter glue.

Eliminated are such accessories as glue pots and rollers and the need to clean and replace them. In operation, glue is fed from a reservoir under low pressure through hoses and applicators directly onto case flaps. Glue is exposed to air only at the moment it is applied.

When unit is not in use, applicators rest on moist pads which prevent glue from hardening on or inside them. Thus, it is ready to operate without make-ready or set-up time.

Other features: Pre-set and constant width and length of glue pattern, electrical overload protection, and automatic cut-off of adhesive flow should unit stop with a case flap in gluing position.—*Emhart Mfg. Co., Portland, Conn.*

Circle 406 On Inquiry Card



Compact Humidity Control

Efficient, automatic control of area humidity is offered by this compact humidifier.

Called Steamette, it discharges steam in a 350-deg. pattern, or portions of this flow may be blanked off as required. Installation is easily made by connection to existing steam supply lines and electrical outlets. Unit uses an atmospheric drain line rather than a condensate return, thus no steam traps are required. Although there is re-evaporation of condensate during operation, the drain line is required to remove excess line condensate on startup.

Unit is supplied with steam solenoid valve assembly including strainer, pressure gage, gate valve, and automatic control. It operates on steam pressures of 2-30 psig. and 115v., is 13¾ in. by 12-in. dia., and weighs 15¾ lb. — *The Bahnson Co,. Winston-Salem, N. C.*

Circle 407 On Inquiry Card

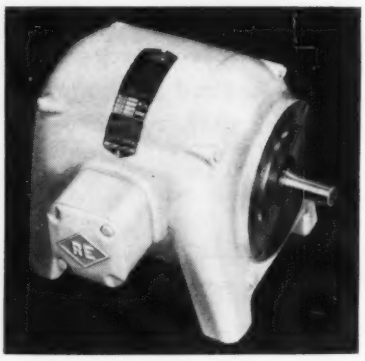
Teflon-Impregnated Belt

Many heat-sealing and conveying applications are seen for an endless belt of Teflon-impregnated glass fabric.

Non-stick and resistance to high temperature are special properties of this flexible material. Reinforcement of the woven fabric offers dimensional stability and long service life.

Belts range in size to 49 in. wide and 210 ft. in circumference. For most applications, 10-mil. cloth is satisfactory. Belts can also be used as facing for existing conveyors.—*General Plastics Corp., Bloomfield, N. J.*

Circle 408 On Inquiry Card



Sanitary Motor

Special design of this sanitary motor guards against food contamination and exposure to corrosive agents.

Typical of these precautions is the unit's splash-proof frame of

(Continued on page 108)

Dorr-Oliver announces

THE NEW MODEL 20 MERCO® CENTRIFUGE

provides low capital and operating costs per gallon processed in the 75-200 GPM range

A complete line of Merco centrifuges is now available from Dorr-Oliver for the process industries. With the introduction of the Model 20 Merco, any capacity requirement in the 1-600 GPM range can now be met with a Merco centrifuge. Check your particular flow range against the table below for the model number to fit a specified flow range.

MERCO MODEL	9	16	18	**20**	30	H-30
CAPACITY GPM	1-20	15-100	50-150	**75-200**	90-300	200-600

This newest addition to our complete line of nozzle centrifugal equipment offers:

- Lower capital and operating costs per gallon of product processed
- Lower horsepower requirement per gallon of product processed
- New and improved feed arrangement
- Higher clarification efficiency

In addition to these specific advantages, the new Model 20 incorporates all of the unique Merco design features of:

- Overhead drive . . . eliminating the need for a bottom bearing
- Built-in hoist . . . for easy in-place cleaning of the rotor
- Camloc nozzles . . . quick and simple removal from *outside* the rotor
- Exclusive return flow principle . . . allows internal washing of solids
- Materials of construction . . . available in stainless steel or bronze

For more information on the Merco line of centrifugal equipment, write to the Food & Pharmaceutical Division office nearest you. Dorr-Oliver Inc., Stamford, Conn., 813 Merchandise Mart, Chicago 54, Illinois, or 2900 Glascock St., Oakland 1, Calif. Ask for Bulletin No. 2606.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

CIRCLE 107 ON INQUIRY CARD

aluminum alloy, stainless steel shaft, special acid-resistant finish, and smooth contour. Perforated metal removable screens give protection against insects.

Horsepower ratings range ¾-7½. Motors are supplied for foot mounting or with NEMA 'C' face-mounting flange for direct assembly to various makes of sanitary pumps. — *Reuland Electric Co., Alhambra, Calif.*

Circle 409 On Inquiry Card

New Sealing Technique Simplifies Box Making

Now available is an automatic case set-up and gluing machine that does not require a compression unit. It handles 40 cases per min. without an operator.

Adhesive is applied by the maker's pressurized glue system. On discharging from the machine, cases have been sealed and are ready for use. Any standard adhesive may be used. — *A-B-C Packaging Machine Corp., Clearwater, Fla.*

Circle 410 On Inquiry Card

CHILLED BY HIGH FREEZING COSTS?

CONTACT KOHLENBERGER!

You'll warm to industrial refrigeration economically designed and manufactured by Kohlenberger. Here's *complete* service covering every aspect of your refrigeration needs...from equipment manufacture and system design to plant layout and field erection. Since 1922 Kohlenberger Engineering Corporation has built its reputation on the skill of its engineers . . . the dependability of its equipment. We'd like to show you how you'll benefit. Write for literature or phone LAmbert 5-3521.

1. KMV Compressor: 20-200 HP. Heavy duty, high speed industrial refrigeration compressor units for ammonia and freon refrigerants.

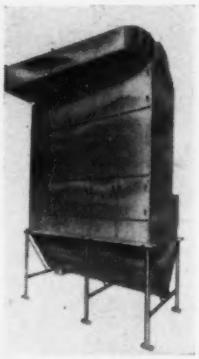
2. KE Condenser: Heavy duty industrial evaporative condenser. 10-200 tons.

3. Krakice Maker: 10-60 ton ice capacity per unit. For every crushed ice requirement.

4. Unit Cooler: Industrial floor-type unit cooler for ammonia, freon and brine refrigerants. 5-30 tons.

Franchises available for qualified industrial refrigeration contractors. Contact C. R. Kohlenberger, president.

KOHLENBERGER ENGINEERING CORPORATION
1600 COMMONWEALTH AVE., P.O. BOX 432, FULLERTON, CALIFORNIA



Dust Collector Offers 3-Way Cleaning

Modular design and self-cleaning action are advantages cited for this new line of automatic dust collectors.

Made of 3/16-in. polished aluminum, unit (Automatic) cleans itself three ways: (1) Periodic shaking of cloth filter tubes combined with reverse airflow through filters, (2) continuous removal of collected material by adjustable screw conveyor at base, and (3) discharge of collected material through a rotary feed valve.

Eleven models, ranging 2 to 12 sections, handle up to 58,000 cfm. Each model is 5 ft. deep and 15½ ft high. Width varies from 4⅔ ft. to 21 5/6 ft., depending on number of sections in bank. Power is supplied by a ¾ hp. motor.—*Torit Mfg. Co., St. Paul, Minn.*

Circle 411 On Inquiry Card

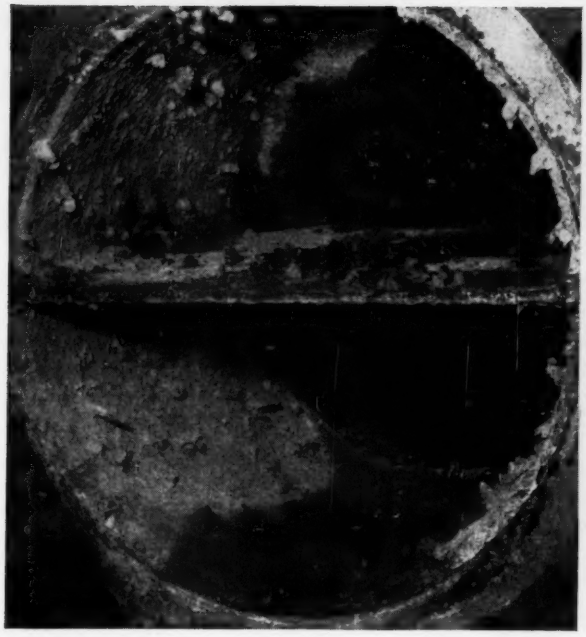
Fast-Opening Bag

This multiwall bag incorporates what is called the first easy opening device to provide full-top or pour-spout opening.

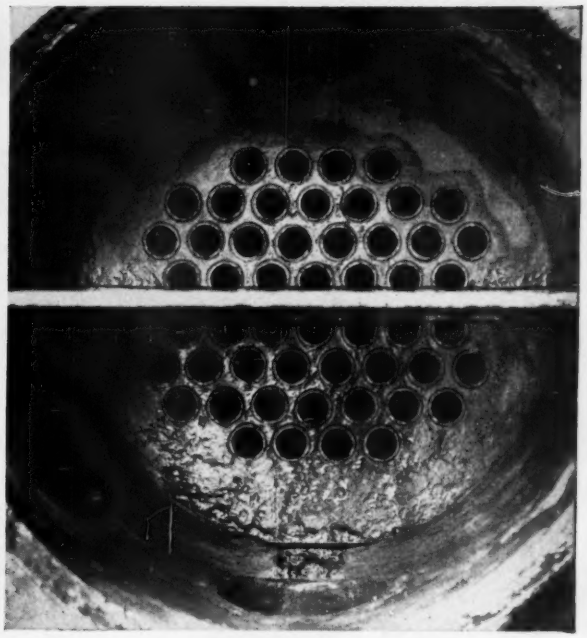
Known as Grip-N-Rip, it uses

(Continued on page 110)

Descale equipment quickly, safely —without dismantling!



BEFORE—This condenser was badly clogged with hard-water scale. Mechanical cleaning of the tubes would have been difficult, time-consuming and costly. To use hydrochloric acid would pose danger to nearby equipment and personnel.



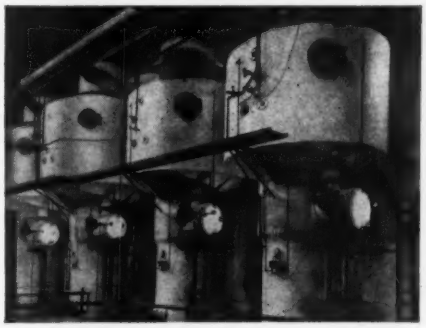
AFTER—It was easily cleaned *without dismantling* by circulating a water solution of a sulfamic acid-based cleaner for an hour. Short downtime, *no* danger to equipment and complete safety for personnel!

Use a dry-acid cleaner based on Du Pont Sulfamic Acid

They're effective. Dry-acid cleaners dissolve hard-water scale and certain food deposits found in cooking vessels, evaporators, heat exchangers, pasteurizers, etc. Yet they're much less corrosive to metal than hydrochloric-acid cleaners, particularly on stainless steel!

They're easy, safe. Just dissolve the solid cleaner in water and circulate through the equipment. Often the acid can be added dry. No danger of broken carboys, spilled liquids, or toxic fumes—glasses and gloves the only protective clothing needed!

They're economical, fast. 1 lb. of dry cleaner does the job of several lbs. of liquid acid—you save on shipping, handling, storage and downtime because there's no dismantling. You clean in place!



Food process equipment like these evaporators is easily descaled with a cleaner based on Du Pont Sulfamic Acid. No dismantling—the cleaner is circulated with the evaporator feed pumps.

Ask your supplier of maintenance cleaners for information on dry-acid cleaners, or send the coupon for booklet and names of formulators offering these products.

E. I. du Pont de Nemours & Co. (Inc.)
Industrial and Biochemicals Department, N-2545FE
Wilmington 98, Delaware

Please send your "Descale" booklet and names of formulators offering cleaners based on sulfamic acid.

*Name*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

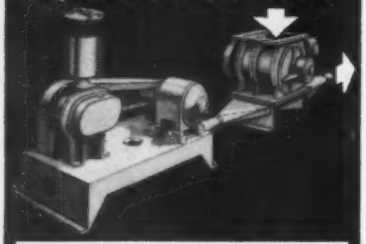
SPROUT-WALDRON PUTS DATA PROCESSING TO WORK TO SAVE YOU MONEY ON PNEUMATIC CONVEYING SYSTEMS

75% to 80% of all pneumatic conveying needs are now standardized systems. Component parts are manufactured in quantity and shipped from stock—*with the savings passed on to you!*

4

STANDARDIZED EASY-TO-ORDER PACKAGED AIR SYSTEMS

stocked for immediate shipment at BIG SAVINGS



Write for Bulletin 228 showing standardized components, capacities, horsepower requirements — complete information on how to order without delay or outside assistance.

627

SW SINCE 1866 SPROUT-WALDRON

Muncy, Pennsylvania

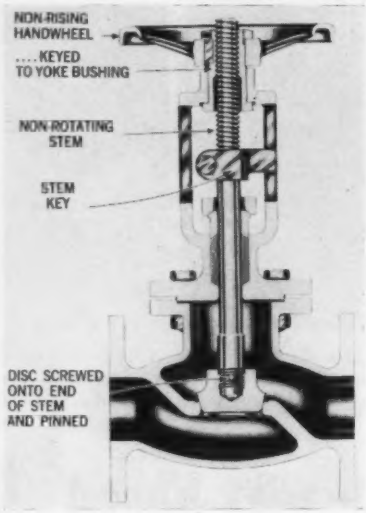
Size Reduction • Size Classification • Mixing & Blending
Bulk Materials Handling • Pelleting & Densifying

Equipment & Supplies (continued)

in place of standard filter cord a triple-strength filter tape. Latter is sewn right over the regular bag top tape to provide a pulling tab for easy opening. It also improves bag appearance.

For full bag top opening, the filter tape is pulled away from the top of the bag. The regular bag top tape, which is held in place by the same thread, is then free, and the bag is completely open.—*St. Regis Paper Co., Bag Div., New York City.*

Circle 412 On Inquiry Card



Valve's Redesign Offers Many Benefits

A new concept in design of globe-type valves promises closer throttling control and elimination of disk and stem vibration.

The change consists of replacing the conventional rotating stem, rising handwheel, and swivel disk with a non-rotating stem, non-rising handwheel, and fixed disk. This design, in valves 2 in. and over, eliminates galling between the stem foot and disk. It also prevents the stem from cutting a spiral through the packing, which can cause leakage.

Improved throttling control is provided by a "key" that prevents stem rotation. It fits into a slot in the bonnet yoke. Since the stem key moves relative to the yoke, latter can be calibrated in terms of degree of desired throttling. Moreover, tight closure permits closer regulation of flow, especially at high velocities.—*Alloy Steel Products Co., Linden, N. J.*

Circle 413 On Inquiry Card

Compact Mailing Machine

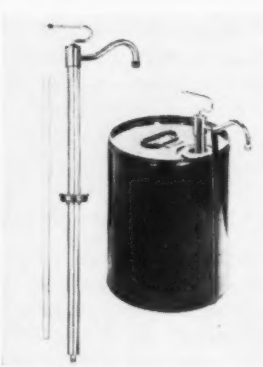
Called the first desk-top electric postage meter machine, this compact unit seals, stamps, and stacks letter mail in one operation.

Or it can issue a meter stamp on wet or dry gummed tape for parcel post or bulky envelopes. It prints any postage denomination from a half-cent to $9.99½ in a single meter stamp.

Designated Model 5400, unit also offers a room to grow feature—an optional envelope feeder which is detachable and fully automatic. This provides a choice between automatic and semi - automatic mailing in the same machine.

The basic machine is designed for low or moderate mail volume and occasional peak mailings, such as monthly statements. For more frequent peak mailings, or as office mail volume grows, the envelope feeder can be added for fast, automatic postage metering.—*Pitney-Bowes, Inc., Stamford, Conn.*

Circle 414 On Inquiry Card

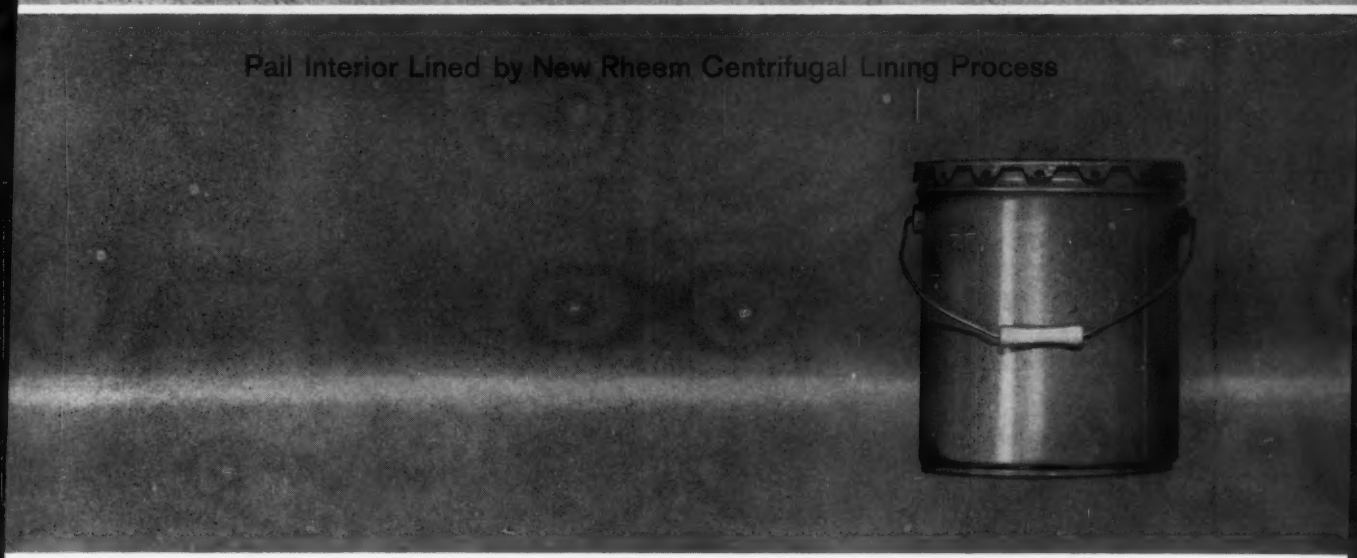


Efficient Dispensing Pump

A new line of pail and drum pumps offers easy dispensing of liquids without waste.

Illustrated Model M45 is used

(Continued on page 112)



Rheem Centrifugal Lining process makes pail linings completely dependable, for best product protection

Look at the blisters and pinholes in the unretouched pail lining photo at top. On impact, the blisters may break, introducing foreign particles into the product. Or, pinholes will expose the contents to bare steel. Chalk up one pail of ruined product – and one unhappy customer.

Now, look at the section of pail lined by the exclusive Rheem Centrifugal Lining process. No blisters. No pinholes or skips. No globs or thin spots, either.

Rheem lined pails assure the same product purity on delivery as at filling. Here's why:

The Rheem Centrifugal Lining process, first method that's not merely an adaptation of painting techniques, operates by centrifugal force instead of air pressure.

Air turbulence is eliminated, allowing a uniform coating to be applied, even in the bead. Solvent content is reduced, minimizing pinholes. The grease and grit of hose lines are avoided. Since the process is completely automatic, human error is eliminated, assuring a lining free of skips, globs and thin spots. The result is the best protection you can get for products packed in pails.

If you are now using pails lined by another process, or using packages of other basic materials, write for samples, information on linings, or a special testing program. Rheem Manufacturing Company, 1701 West Edgar Road, Linden, N. J. Plants across the country.

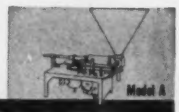
WORLD'S LARGEST MANUFACTURER OF STEEL SHIPPING CONTAINERS

Rheem

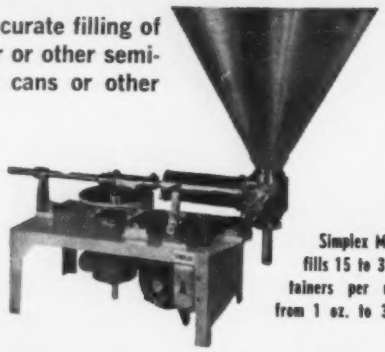
How it works: Pail shells move up to automatic Centrifugal Lining equipment (left). Positioning arms clamp pail and (right) raise it past spinning centrifugal applicator head. Angle, distance and speed never vary. Result: completely uniform linings – completely dependable protection for your product.

Compact, inexpensive

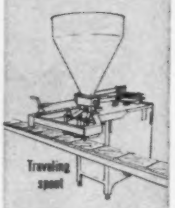
SIMPLEX PISTON FILLER



for fast, accurate filling of cake batter or other semi-solids into cans or other containers



Simplex Model A fills 15 to 30 containers per minute from 1 oz. to 32 oz.



- REMARKABLY SIMPLE CONSTRUCTION—VIRTUALLY MAINTENANCE-FREE!
- EASILY CLEANED IN A FEW MINUTES!
- HAND LEVER CUTS OFF FLOW INSTANTANEOUSLY!
- DURABLE 316 STAINLESS STEEL IMPERVIOUS TO ACIDS!
- EVERY MODEL ENGINEERED TO CUSTOMER REQUIREMENTS FOR GIVEN RANGE OF OPERATIONS!

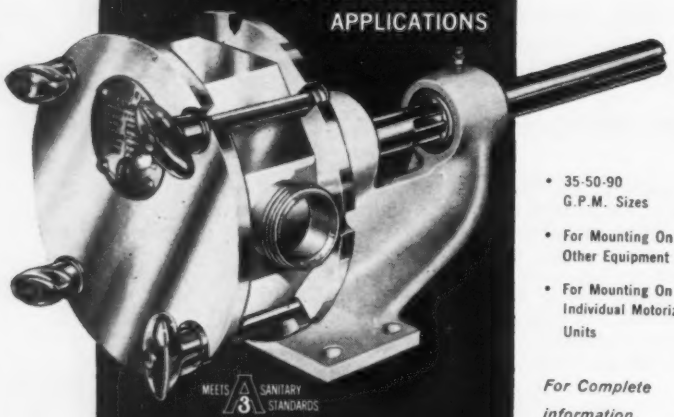
Write for prices and Bulletin 106 • Representatives in all principle areas

Mfg. by **F. L. BURT CO.** 1144 Howard St., San Francisco, Calif.

CIRCLE 144 ON INQUIRY CARD

MANY USES!

VIKING 8171 "SANITOR" PUMPS FIT HUNDREDS OF APPLICATIONS



MEETS 3A SANITARY STANDARDS

- 35-50-90 G.P.M. Sizes
- For Mounting On Other Equipment
- For Mounting On Individual Motorized Units

For Complete information, write for catalog FE

Many uses! In dairy and food plants throughout the world they're saving with "Sanitors" in a wide range of pumping jobs. You can, too. Available in 18 models, featuring easy take-down.

- No tools needed
- Rapid cleaning
- Smooth and Positive Delivery
- Fast self priming
- Non-leak operation

VIKING PUMP CO.

Cedar Falls, Iowa, U.S.A.
In Canada, it's "Roto-King" Pumps

See Our Catalog in Sweet's Plant Engineers File

Equipment & Supplies

with 5- and 6-gal. pails. It is self-priming and dispenses exactly 4 oz. per stroke—ideal for small-container filling. Unit is easily installed and adaptable to all size and type pail openings.

A Model M855 pump is designed expressly for use with 15-, 30-, and 55-gal. drums, and dispenses 8 oz. per stroke. It eliminates drum racking, which saves floor space, and pump may be padlocked to eliminate possible misuse.

Both models are made of machined steel parts and are entirely nickel-chrome plated. They are self-venting and leak-proof. — *Multi-Meter Corporation, Toledo, Ohio.*

Circle 415 On Inquiry Card

Provides Easy Handling, Efficient Insulation

Where multi-door loading docks are used for rapid truck loading, this horizontal-sliding cooler door offers reliable insulation and rapid, easy access to cold-storage area.

Simplified in design to cut cost, the door's front, back, and edges are of plywood sheathed with 26-gage steel. Latter is galvanized to resist weathering and corrosion. Polystyrene plastic inside the door provides efficient insulation, and flexible gaskets and seals prevent air leaks.

The door's light weight permits easy handling. Each unit is suspended from wheeled trolleys which run along a steel overhead track. Latter is slightly inclined so door rolls automatically to a compression seal, but can be held

(Continued on page 114)

Interchangeability

wider range of cut sizes
...on the new Urschel model G
...on your present Urschel model

now
new interchangeable parts for:

DICES (3 sizes) 3/8″ – 7/16″ – 1/2″

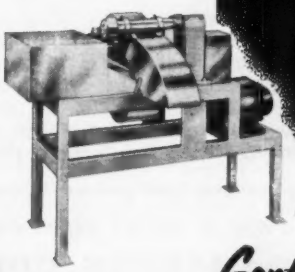
FRENCH FRY CUTS (3 sizes) 3/8″ – 7/16″ – 1/2″

JULIENNE CUTS (3 sizes) 5/32″ – 3/16″ – 1/4″

SLICING – any thickness to 3/4″

SPECIAL CUTS – 3/16″ x 3/16″ x 3/8″ – 1/4″ x 3/8″ x 3/4″
– 1/8″ x 3/4″ x 3/4″ – 1/2″ x 1″ x 1″

For:
Apples
Beets
Cabbage
Carrots
Celery
Citron
Fruits
Melon
Mushrooms
Onions
Papaya
Peaches
Pears
Peppers
Pickles
Pineapple
Potatoes
Tomatoes



Model G Dicer

For complete information write:

URSCHEL LABORATORIES INC.
VALPARAISO, INDIANA

Gentle precision-cutting of products up to 11 tons per hour.

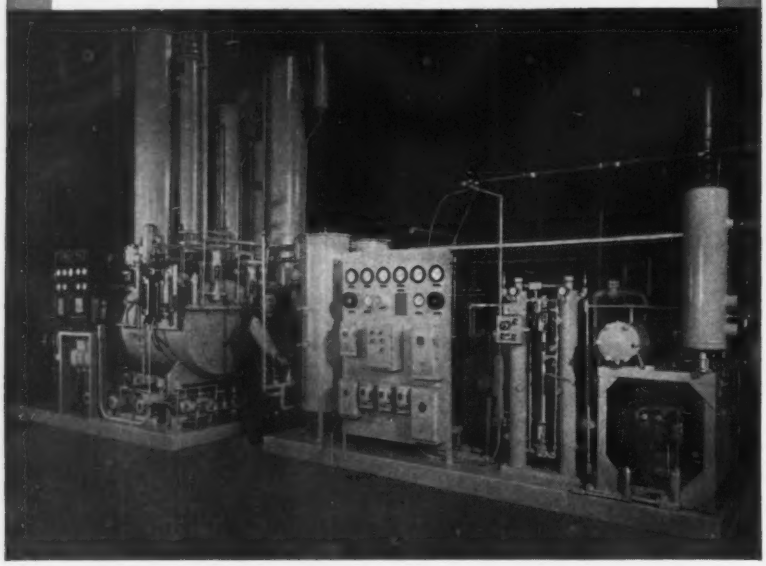
Designers and manufacturers of precision, high speed cutting equipment for food products.

DeMARKUS

packaged

CO_2 AND NITROGEN MANUFACTURING SYSTEMS

for all food industry needs



The economical way to meet your constant demand for pure CO_2, dry ice and nitrogen

Food plants everywhere are turning to the specialists of DeMarkus for the answer to a more practical and economical way of satisfying their constant demands for pure CO_2 and Nitrogen used in their processing operations.

Large users of CO_2 and N_2 can enjoy tremendous savings with DeMarkus Packaged Systems because the efficient process used reduces production costs to about 1¢ per pound for CO_2 and less than 2¢ per 100 SCF for nitrogen.

Compare these costs with your current total expense for purchased gas and you see why more and more economy-minded, profit-wise food producers are buying DeMarkus Packaged Systems!

Standard DeMarkus Packaged Systems produce 50 to 500 lbs. of CO_2 per hour, 2800 to 28000 SCFH of nitrogen. Large-size custom-built plants are also available.

Let us send you complete information--even make a complete cost study for you--at no obligation. Write today.

DeMarkus also produces inert gas and hydrogen plants.

WRITE TODAY FOR DETAILS

LOUIS DeMARKUS CORPORATION
and DeMARKUS INTERNATIONAL CORPORATION
(Western Hemisphere outside U.S.A.)
Specialists in Gas Manufacturing and Purification Processes
3085 MAIN STREET, BUFFALO 14, N. Y., U.S.A. • Cable Address: DICO Buffalo
In Europe: N.V. "AMA", ALKMAAR, HOLLAND

open simply by positioning the door on the track.—*Jamison Cold Storage Door Co., Hagerstown, Md.*

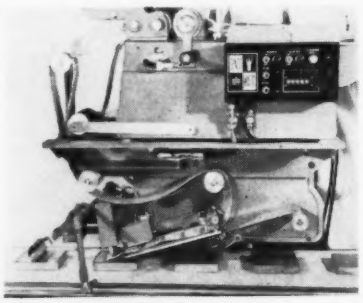
Circle 416 On Inquiry Card

Multi-Use Plastic Tank

Designed for mixing, storage, and unitized movement of foods before or after cooking, this 350-gal. polyethylene tank has a wall thickness of only 5/16 in. Yet it is self-supporting and non-distorting when filled.

Principal advantages cited for the colorless, translucent tank are easy cleaning, long service life, light weight, and corrosion resistance. It is 46 in. dia. by 52 in. high, and the cover is also of polyethylene.—*American Agile Corp., Bedford, Ohio.*

Circle 417 On Inquiry Card



Imprinting Labeler

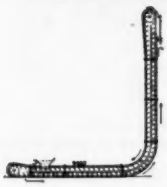
With this new unit, labels may be imprinted and applied to packages of almost any size or shape right on the production line. Thus, large label inventories are no longer necessary and label obsolescence is reduced. (Continued on page 116)

STEPHENS-ADAMSON

moves bulk material en masse vertically — horizontally — on inclines or around bends with REDLER®

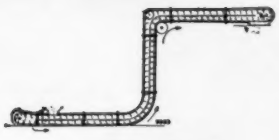
CONVEYOR-ELEVATOR SYSTEMS

S-A REDLER Conveyor-Elevators have a coveted 25 year reputation of successful operation. Well over 20,000 units handle a wide range of pulverized, granular, small lump and flaked materials in plants throughout the world. The REDLER Conveyor-Elevator moves material by EN MASSE action horizontally, vertically, on inclines or around bend corners. Material movement is continuous within totally enclosed, dust-tight compact casings, permitting large tonnage handling in small space. REDLER Conveyor-Elevators can be adapted to removing solids from a liquid bath in solvent extraction plants. The conveying elements, a series of U-type skeleton flights shown above in cut-away, move readily around sprockets and bend corners with relatively low power required at the drive. Skeleton flights may be easily unhooked and replaced without tools. S-A REDLER Conveyor-Elevator Systems speed efficiency reducing bulk materials handling to lowest cost per ton.



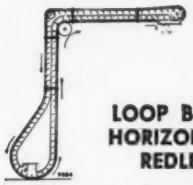
L-TYPE REDLER

Lower run can be horizontal or inclined. Elevating run can be operated at any required inclination. Special discharge openings can be spaced anywhere. Discharge to any one of three sides. Many variations of standard L-Type system available.



Z-TYPE REDLER

Combines two horizontal conveyors and one vertical elevator into one compact unit. One feedpoint, one discharge and one drive. Feed from choked feedpoints on horizontal run.



LOOP BOOT HORIZONTAL REDLER

Simplest form for elevating material up steep inclines. Column of material is supported on all four sides at inclines above the angle of slide for materials handled. Low headroom for feedpoints. Discharge gates placed wherever needed.

HORIZONTAL CLOSED CIRCUIT REDLER

"Run-around" type system employs side-pull conveying element. Permits conveying in several directions on horizontal plane. Available in two-way version featuring 180° bends and four-way version featuring 90° bends.

WRITE FOR BULLETIN 358

S-A
ENGINEERED BULK HANDLING SYSTEMS
MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERICO® BEARINGS & ROD ENDS

ENGINEERING DIVISION

STEPHENS-ADAMSON MFG. CO.

GENERAL OFFICE & MAIN PLANT, 6 RIDGEWAY AVE., AURORA, ILL.

PLANTS LOCATED IN: LOS ANGELES, CALIF. • CLARKSDALE, MISS.
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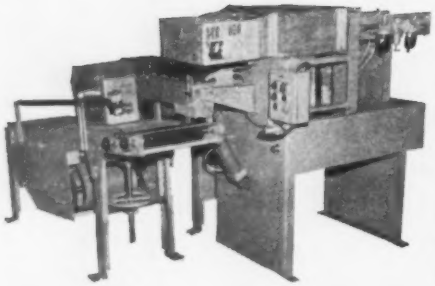
at industry's request...



Standard-Knapp Type 806 Package Packer has been redesigned to handle a wider range of carton sizes. Same proven efficiency with improved adjustability. Please write for bulletin TP-394C. Emhart Manufacturing Company, Portland Division, Portland, Conn.

EMHART

CIRCLE 145 ON INQUIRY CARD

Need Filter Materials NOW?

FILPACO

Stocks most items for

IMMEDIATE DELIVERY!

If you need quality filter materials at a saving, specify "FILPACO" as so many processing and manufacturing firms in your industry are doing.

Filter paper in complete range of grades available . . . samples furnished for testing or send us your materials for testing. Also filter cloth: cotton, wool, felt, glass, Orlon, Dynel, Saran, silk, Dacron, Polyethylene, Filyon, Nylon, Polypropylene and others . . . cut and sewn to your required sizes and shapes.

Your inquiry is invited

FILPACO INDUSTRIES
THE FILTER PAPER CO.
2450 S. Michigan Avenue, Chicago 16, Illinois

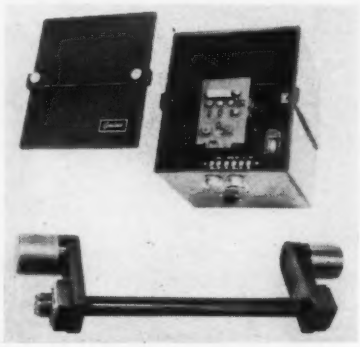
FILPACO Manufactures an Extensive Line of Filters, Filter Materials, Tanks, Mixers and Filters.

Equipment & Supplies

Known as "Sensomatic," it operates at line speeds to 180/min. Basic information is preprinted on rolls of pressure-sensitive labels, while variable data is printed during labeling. Unit can be used with any type of conveyor.

Equipment is offered on a six-month renewable lease basis with option to buy after five years.—*Monarch Marking System Co., Dayton, Ohio.*

Circle 418 On Inquiry Card



Conveyor-Control System

Greater handling efficiency for conveyor systems and lower maintenance cost are offered by this electronic control. Its precision action cuts the number of motor stops and starts, thus reducing motor wear.

The completely transistorized unit eliminates need for mechanical devices, such as balance beams and pressure bars, which are potential trouble points even at low speeds in mechanical systems. To minimize maintenance, the control is protected against moisture, dirt, and vibration. Sensing head to control box connecting cable may be any length up to 1,000 ft.

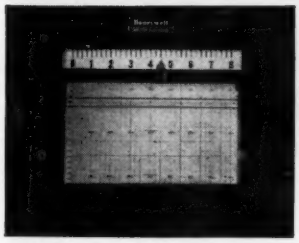
The optical sensing head (bot-

(Continued on page 118)

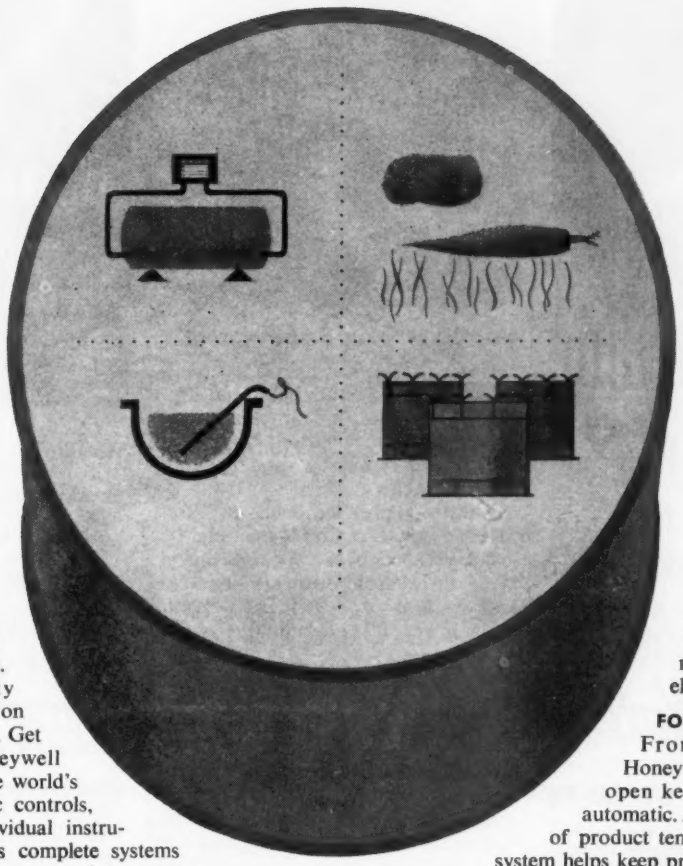
FOR MORE INFORMATION...

. . . simply circle key item number on handy Inquiry Card—back of book. Then print your name and address, and mail. For your convenience, these items are also listed and keyed in Reader Inquiry section.

Honeywell complete food processing instrumentation



- Zone-Control Blanching
- Fast Automatic Peeling
- High-Yield Open Kettle Cooking
- Packaged Retort Control Systems



PAYS OFF IN CONSISTENT QUALITY FOR YOUR CANNED FOODS

The selling power of canned goods is only as good as the consistency of the quality from can to can. Only consistent quality brings sound profits based on real consumer acceptance. Get this quality with Honeywell instrumentation. From the world's largest line of automatic controls, Honeywell furnishes individual instruments and custom-designs complete systems to regulate virtually every canning process.

FOR BLANCHING. Honeywell instrumentation ensures the proper fixing of color, taste, and firmness of the finished product by providing precise control of blanching temperatures. This instrumentation automatically compensates for varying input temperatures, load rates, and other factors by separately controlling the temperatures in both the inlet and outlet zones.

FOR PEELING. By closely controlling process variables such as temperature and solution concentration, Honeywell peeler control systems reduce process costs and eliminate product waste.

FOR OPEN KETTLE COOKING. From filling to draining, Honeywell control systems make open kettle cooking completely automatic. Also, the accurate control of product temperature provided by the system helps keep product yield high.

FOR HORIZONTAL AND VERTICAL RETORTS. Honeywell's approach to retort instrumentation is characterized by simplicity and low cost. By offering a number of packaged control systems using the same basic instruments, Honeywell simplifies the development and altering of automatic retort systems.

Your nearby Honeywell field engineer will be glad to discuss all your instrumentation requirements. Call him today. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

First in Control

SINCE 1906

HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.

New Type Organic Chlorine Powder

KLENZADE

Tri-Chloro-Cide

Non-Corrosive for All Stainless Steel Processing Equipment

NO FILM
NO SEDIMENT

Sparkles in Hardest Water!

HIGH GERMICIDAL STRENGTH

Klenzade has greatly reduced the corrosion problem common to ordinary chlorine sanitizers with Tri-Chloro-Cide — a high powered stable chlorine powder that won't pit or corrode stainless steel. Tri-Chloro-Cide is an *organic* chlorine that produces a clear, sparkling solution of exceptional germicidal strength . . . even in hardest water! Tri-Chloro-Cide is perfect for fogging or rinsing. Leaves no film or sediment. Remarkably stable, quickly soluble, excellent shelf life.

MAKE EQUIPMENT SAFE WITH } Tri-Chloro-Cide ORGANIC CHLORINE

KLENZADE PRODUCTS, INC.

Branch Offices Throughout America

DEPT. 30J

BELOIT, WISCONSIN

Equipment & Supplies

tom of photo) has a long-life source lamp and a 3/32-in. dia. pre-aligned light beam. — *Genisco, Inc., Los Angeles.*

Circle 419 On Inquiry Card

For Fast Brix Readings

Quick, easy reading of total solids is offered by this hand and dipping refractometer. Internal temperature compensation precludes use of thermometer and/or conversion tables.

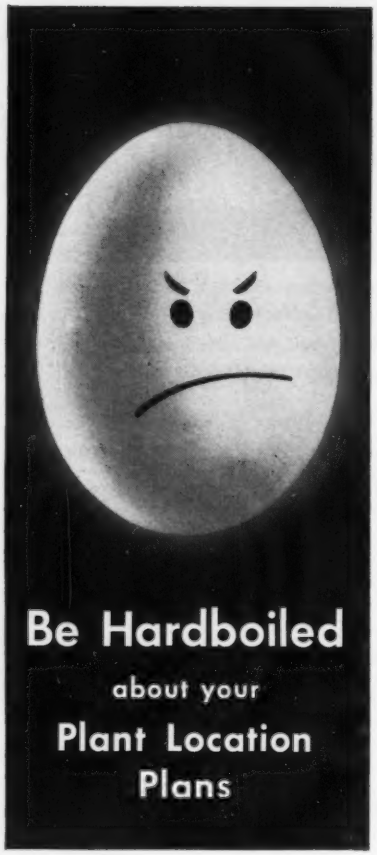
Simply apply two drops of sample and make a direct reading by looking through the focusable eyepiece. Accuracy is termed equivalent to that of a lab instrument. Unit has a 0.1% graduated scale, Brix range 0-25%.—*American Optical Co., Buffalo, N. Y.*

Circle 420 On Inquiry Card

Refrigeration-Heating System, for highway trailers and 'piggyback' operations, offers precise food-temperature control and savings in weight and cube. Two-unit system (Model TDU-800) consists of diesel-engine-driven condenser and evaporator. Load temperature and control setting are dial-indicated, while pilot lights show normal operation and type of cycle — heat, cooling, or defrost. — Worthington Corp., Harrison, N. J.

Circle 421 On Inquiry Card

Air-Attrition Mill (Hurricane) reduces and accurately classifies confectionery coatings and fillers to fineness of less than 1 micron. Dry milling of ingredients prior



We like to work with hardboiled plant location people. The harder-boiled the better. That's because we can prove the Toledo-Northwestern Ohio area offers unmatched opportunities for Food Processing Industries. Our proof is contained in a survey of the area by Fantus Research, Inc., one of the nation's foremost industrial location services. For more information, write or call R. E. Johnson, Manager, Industrial Development Department, The Toledo Edison Company, Toledo 1, Ohio

THE TOLEDO EDISON COMPANY

an investor-owned electric light and power company serving Northwestern Ohio

CIRCLE 118 ON INQUIRY CARD

CIRCLE 146 ON INQUIRY CARD

to mixing into melted fats offers superior product texture and flavor.—Bauer Bros. Co., Springfield, Ohio.

Circle 422 On Inquiry Card

Automatic Bagger with fast feed cutoff weighs 24 50-lb bags per min. of free-flowing material. Capacities of units (Speedac E-50) range 5-100 lb., and various discharge options are available.—Richardson Scale Co., Clifton, N. J.

Circle 426 On Inquiry Card

Heat Sealer applies film covers to pre-filled formed containers. Seal may be peelable or boilable, and can be dispensed from a roll (printed and registered).—Packaging Industries, Montclair, N. J.

Circle 427 On Inquiry Card

For the Lab

Latest Soxhlet Extractor

Design of this new heating mantle for Soxhlet extractions offers both safe and efficient operation.

Unit's anodized aluminum housing holds six flasks. Use of a resilient cork-like material guards against mechanical flask damage, and heating elements can be replaced individually. Three models accommodate flask sizes of 250, 300, and 500 ml.—*Glas-Col Apparatus Co., Terre Haute, Ind.*

Circle 423 On Inquiry Card

Conical Spray Dryer for laboratory development and small-lot production may be rented for periods of six weeks or more. Unit is adaptable to both nozzle and centrifugal wheel atomization.—Bowen Engineering, Inc., North Branch, N. J.

Circle 424 On Inquiry Card

Pilot Agitating Sterilizer expedites heat-process studies. Self-contained unit has variable-speed motor, thermometer, safety valve, and pressure gage. Dimensions: 24 in. dia. x 50 in. long; cage size, 12x12 x12 in. Working pressure is 30 psi. or higher.—Berlin Chapman Co., Berlin, Wis.

Circle 425 On Inquiry Card

Is it fish or fowl... or even fancy fruit?

Here, at last, is **a family of sparkling plastic containers** which will propel your product off the counter or out of the freezer or refrigerator right into Milady's shopping cart!

J-E's food containers were designed for **you.** They can be filled at plus-boiling temperatures and immediately quick frozen without distortion or clouding. Available in rounds and rectangles—from 5 ounce to 16 ounce capacity—J-E containers are fitted with snap-in, snap-on or snap-over lids which require no adhesives or tapes . . . or they can be heat sealed. And J-E hasn't forgotten the store level problems, either . . . lids and pre-cut sheets for heat sealing are recessed to prevent slipping and sliding, even when frozen.

Put more sparkle in your sales with an economical food container of FDA-approved oriented styrene!

J-E PLASTICS MANUFACTURING CORP.

400 Nepperhan Avenue, Yonkers, New York • Phone: GR 6-3456

Clip and return this coupon . . .

We'll see that you receive complete technical data **plus** an appropriate sample of a sales-minded J-E container.

NAME_____

ADDRESS_____

COMPANY_____

OUR PRODUCT IS_____

PLEASE SEND ME TECHNICAL DATA_____

F-E 9-61

CIRCLE 119 ON INQUIRY CARD

SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED

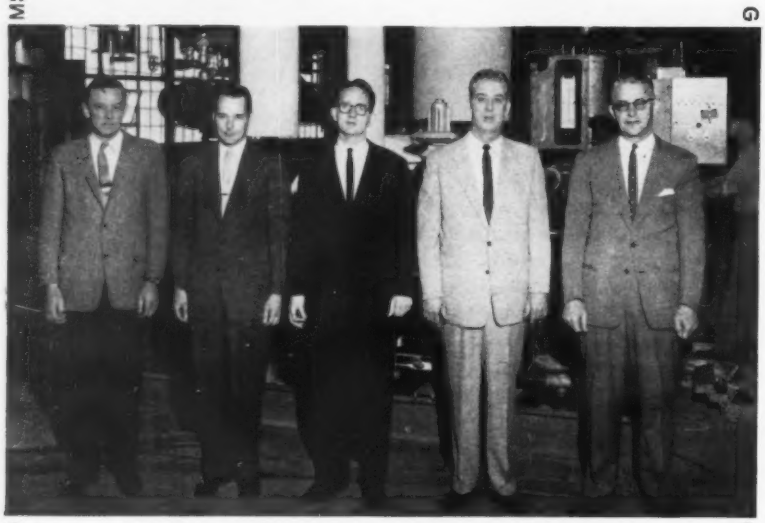
BUYING GAS GENERATORS ON PRICE ALONE IS A DANGEROUS PURCHASING PRACTICE

Experienced engineers and purchasing agents long ago discovered "you get exactly what you pay for" when buying gas generation equipment.

PERFORMANCE FAILURES due to substituting cheaper parts, in an effort to cut costs to get the order, have resulted in production delays that cost far more than was saved by purchasing the lowest priced generation equipment.

NO ASSURANCE OF RELIABILITY of the maker . . . except that he will produce a generator cheaper than anyone else . . . causes headaches a year or so later when parts are needed and he's already priced himself out of business.

LACK OF DEPENDABLE SERVICE can cost thousands of dollars in downtime. Gas Atmospheres builds the finest generators made today and, to protect our customers, we maintain the industry's largest service engineering staff.



Gas generation industry's most experienced service engineering staff. These Gas Atmospheres engineers are available for complete service work on any make of gas generation equipment. Call or write the address below.

Remember, Gas Atmospheres is the nation's foremost exclusive manufacturer of gas generation equipment. We do not build for price, but for quality. In the long run this pays off for everyone concerned. *Gas Atmospheres, Inc., 3855 West 150th Street, Cleveland 11, Ohio.*

gas Atmospheres, inc
equipment for producing industrial gases

4234

PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED GAS SYSTEMS PACKAGED

Food Ingredients & Additives

SACCHARIDE DISTRIBUTION OF NEW SWEETENERS

Saccharide (Carbohydrate Basis)	SuVel 160 (%)	SuVel 250 (%)
Sucrose	60.0	22.0
Levulose		14.0
Dextrose	5.9	21.4
Maltose	4.8	6.0
Trisaccharides	4.2	5.2
Mixed Polysaccharides	25.1	31.4
Moisture	28.0	22.0

New-Form Sweeteners Up Product Quality

Seen improving the quality of ice cream and frozen desserts—while cutting ingredient costs—are two new sweeteners.

As shown in the above table, the products (SuVel 160 and 250) have an unusual distribution of saccharides. This characteristic offers desirable product qualities, such as low freezing-point depression, improved texture and resistance to heat shock, and increased "dryness."

When used as recommended, the sweeteners permit rearranging formulas for cost reduction while maintaining about the same total solids in the mix.—*Penick & Ford, Ltd., New York City.*

Circle 466 On Inquiry Card

Efficient Pepsin Coagulant For Cheesemakers

Quality and curing properties of Cheddar cheese may be improved with use of a new standardized pepsin preparation.

Called "DFL Pepsin Coagulant," product meets requirements for a short-hold cheese. Should marketing conditions also warrant use of pepsin in a long-hold cheese, maker recommends that it be used in conjunction with rennet extract.

The pepsin coagulant contains sodium chloride, caramel color, flavor, and preservatives. — *Dairyland Food Laboratories, Inc., Waukesha, Wis.*

Circle 467 On Inquiry Card

SUPERESINS®

WILL *SLASH* YOUR COSTS

DRAMATIC SAVINGS are being made by large food processors and meat packers who have switched to FRITZSCHE'S new line of essential oil – oleoresin mixtures...

SUPERESINS®

When extended on a dry soluble carrier (such as salt or anhydrous dextrose), these carefully controlled, standardized materials replace the corresponding natural spices *pound for pound.* By using them, manufacturers can now *prepare their own dry soluble spices as needed,* thus eliminating the higher cost, bulk storage and deterioration problems often associated with the commercially made offerings. SUPERESINS® are made in our Clifton plant from the finest grades of selected spices and all conform to Federal Specifications EE-S-645. Examine the accompanying list and then write us on your letterhead for free test samples of those that interest you.

ALLSPICE
(Pimenta Berries)
BASIL
BLACK PEPPER
CAPSICUM
CARAWAY
CARDAMOM
CELERY
CINNAMON
CLOVE
CORIANDER
CUMIN
DILL SEED
FENNEL
GINGER
MACE
MARJORAM
NUTMEG
SAGE
THYME

The above SUPERESINS® *are available in 5 gal. (35 lb.) steel pails with pouring spouts and covers.*

FB INC.

FRITZSCHE BROTHERS, Inc.

A FIRST NAME IN FLAVORS SINCE 1871

76 NINTH AVENUE NEW YORK 11, N. Y.

Branch Offices and *Stocks: Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, Ohio, Greensboro, N. C., *Los Angeles, Cal., Philadelphia, Pa., San Francisco, Cal., St. Louis, Mo., Montreal and *Toronto, Canada; *Mexico, D. F. and *Buenos Aires, Argentina. **Plants:** Clifton, N. J. and Buenos Aires, Argentina.

Just off the press

Free catalogs and bulletins on equipment, supplies, and services

PLANT ENGINEERING

CENTRIFUGAL PUMPS. Provides information on bearing life expectancy, shaft deflection, and other performance, application, and dimension data. 15p.—Goulds Pumps, Inc., Seneca Falls, N. Y. **(211)**

DRY FLUID DRIVES. Eight stock units and 11 stock couplings are listed for fractional to 1,000 hp, together with installation photos, product features, and engineering drawings. 20p.—Dodge Mfg. Corp., Mishawaka, Ind. **(212)**

FLEXIBLE PIPE CONNECTORS. Contains thorough analysis of units, their application, design, and handling, with illustrations and data charts. 32p.—Allied Metal Hose Co., Long Island City, N. Y. **(213)**

GASOLINE ELECTRIC SET. Gives details and specs on both gasoline engine and a-c brushless generator, with illustrations and specs on important components. 6p.—Allis-Chalmers, Milwaukee, Wis. **(214)**

JET BLOWERS & BLAST NOZZLES. Describes complete unit line that utilizes pressure steam and compressed air to move large volumes of air in ventilating and circulating applications. 8p.—Schutte & Koerting Co., Cornwells Heights, Pa. **(215)**

STATIONARY AIR COMPRESSORS. Unit types from ½ to 15 hp for displacements up to 70 cfm are described, together with stationary models from 25 to 100 hp. 4p.—Westinghouse Air Brake Co., Sidney, O. **(216)**

SHELL-TYPE MOTORS. Details units available in open, enclosed, or liquid cooled ratings, ranging from ½ to 150 hp, featuring accuracy and close tolerances. 4p.—The Louis Allis Co., Milwaukee, Wis. **(217)**

SILICONE RUBBER PRODUCTS. Properties and applications of wide range of products are outlined, including sponge and sheet, custom roll coverings, conveyor belting, tubing, etc. 12p.—Hewitt-Robins, Stamford, Conn. **(218)**

LATTICE BRAID PACKINGS. Provides technical data and other information on new type made from long fiber asbestos yarn with Teflon impregnation. 8p.—Garlock Inc., Palmyra, N. Y. **(219)**

WORM GEAR SCREW JACKS. Details complete line of units for leveling, adjusting, and stabilizing machinery & equipment, including data on two new 10 and 25 ton sizes. 28p.—The Joyce-Cridland Co., Dayton, O. **(220)**

CORROSION RESISTANCE/LUBRICATION. Details a new air dry solid film lubricant priced and produced for commercial applications. 4p.—Electrofilm Inc., North Hollywood, Calif. **(221)**

FLEXIBLE CUSHION COUPLINGS. Introduces an expanded line of units that absorb vibration and compensate for shaft misalignment and end float. 23p.—Dodge Mfg. Corp., Mishawaka, Ind. **(222)**

LEAKPROOF PUMPS. Covers design, operation, and selection of canned units, including illustrations. 4p.—Fostoria Corp., Huntingdon Valley, Pa. **(223)**

CENTRIFUGAL PUMPS. Gives complete specs, interchangeability chart, performance curves, and dimensions of thirty-four new sizes. 15p.—Goulds Pumps Inc., Seneca Falls, N. Y. **(224)**

STEELFLEX COUPLINGS. Introduces firm's line of torsionally resilient units in new types and larger sizes. 23p.—Falk Corp., Milwaukee, Wis. **(225)**

PROCESSING

SILICONE ANTIFOAMS. Details suitability of FDA sanctioned types for use in food processing and packaging, including prescribed levels for their use given in comprehensive property tables. 8p.—Hodag Chemical Corp., Skokie, Ill. **(226)**

MAGNETIC SEPARATOR. Describes self-cleaning unit for fully automatic tramp iron separation, available in three types for suspension over conveyors, chutes, or spouts. 4p.—Dings Magnetic Separator Co., Milwaukee, Wis. **(227)**

DRY PROCESSING EQUIPMENT. Discusses firm's full line of lab and production units, including information on new flour refining system, mixers, grinders, feeders, etc. 8p.—Sturtevant Mill Co., Boston, Mass. **(228)**

CHILLER UNITS. Contains piping and installation diagrams, dimensions, specs, and features of recirculating and flooded Ammonia units for meat packing industry. 10p.—Recold Corp., Los Angeles. **(229)**

PORTABLE MIXERS. Provides detailed description of factors involved in mixer selection, including selection table for units ranging from ¼ to 3 hp. 12p.—The Cleveland Mixer Co., Bedford, O. **(230)**

HORIZONTAL MIXERS. Units adapted to free flowing, granular materials are described, including design, technical, and dimensional data for capacities from ½ to 500 cu. ft. 12p.—The Young Machinery Co., Inc., Muncy, Pa. **(231)**

ELECTRODIALYSIS. Provides information on electrodialytic conversion of brackish water to fresh water, including details on method's application to chemical recovery.—Aqua-Chem Inc., Waukesha, Wis. **(232)**

PROCESS EQUIPMENT BUYER'S GUIDE. Covers items fabricated from Glasteel, Nucerite, stainless steel, titanium, zirconium, tantalum, and other materials for corrosion resistant service. 16p.—Pfaudler Permutit, Rochester, N. Y. **(233)**

FLOW RESPONSIVE EQUIPMENT. Introduces a method of combining fluid meters and proportioning pumps so that given process will be continuous, with all units synchronized and controlled from a single source. 4p.—B-I-F Industries, Providence, R. I. **(234)**

QUICK-OPENING DOOR. Describes 3/30" unit for production pressure vessels, with 16 illustrations as applied to autoclaves, sterilizers, vulcanizers, and similar pressure equipment. 6p. — Biggs-United, Akron, O. **(235)**

CLUSTER CUTTER. Introduces new unit for snap beans with simplified, efficient operation and over 9,000 lbs./hr. capacity. 2p.—Chisholm-Ryder Co., Niagara Falls, N. Y. **(236)**

FEEDER AUTOMATION ACCESSORIES. Contains detailed information on new electric vibrators, designed to keep hard-to-flow materials moving freely in hoppers, bins, and chutes. 4p.—Automatic Feeder Co., Chicago. **(240)**

CONFECTIONERY EQUIPMENT. Provides illustrations and specs for roasters, cleaners, refiners, coaters, sifters, etc., including available detailed information on each unit. 4p.—Jabez Burns & Sons, Inc., NYC. **(237)**

(Continued on page 124)

FOR FREE LITERATURE...

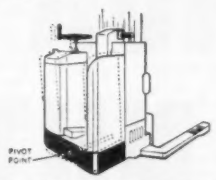
. . . simply circle key item number (found at the end of each item) on handy Inquiry Card—back of book. Then print your name and address, and mail.

Announcing a

new.... ....feature-packed AUTOMATIC® Transveyor

Here's the narrow aisle truck that sets a new standard for driving ease, serviceability, and lower operating costs. Some of its many features are shown below:

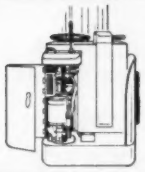
QUADTROL control handle combines speed and lift controls in one unit for easier driving. One handle controls three speeds forward and reverse plus lifting and lowering of the forks.



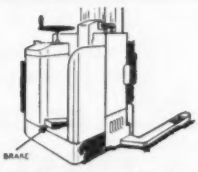
KNEE ACTION FRAME assures stability under all conditions. Straddle arm section pivots independently of drive unit section, preventing frame distortion, lack of traction, and instability on uneven floors.

BATTERY REMOVAL top or side. Battery may be rolled out from either side. Steering wheel and Quadtrol controller swing back to allow overhead removal or servicing.

CHANGE FROM AUTOMOTIVE to reverse steering in minutes by changing position of two bolts. Simplifies standardization of steering with rest of fleet.



ACCESSIBILITY of parts simplifies servicing. Rear cover swings out to put drive motor, electrical components and brake within easy reach for servicing.



ELECTRICALLY-INTERLOCKED controls prevent starting or reversing in any but first speed position. Current is disconnected when hydraulic brake is applied.

MODEL VST
capacities 2000, 3000, and 4000 lbs.

Send for full details NOW!

- ☐ Please send complete specifications and feature data on new Model VST Transveyor.
- ☐ Please send "NEW DIMENSION" booklet which discusses narrow aisle truck applications and available types.
- ☐ Please have your representative call me.

Name_____ Title_____

Company_____

Street_____

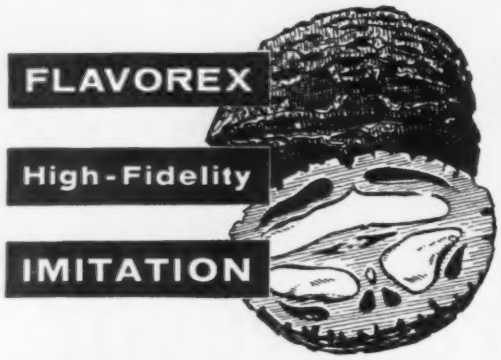
City_____ Zone____ State_____

AUTOMATIC

AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale and Towne Manufacturing Co.
125 W. 87th Street, Dept. PI, Chicago 20, Illinois

FIRST IN IMAGINATION / FIRST WITH REALITY

New finer flavor improves sales!



BLACK WALNUT

with exclusive Walnadyne

--a synergistic compound that gives these advantages--

- TRUER FLAVOR
- HEAT RESISTANT
- DISPERSES READILY
- GREATER STABILITY
- ECONOMICAL

BLACK WALNUT NO. 2047

Used ½—1 oz PER 100 LB. BATCH. Price per gallon **$12.50**

Better Flavors for Better Products

FLAVOREX CO., INC.

302 S. CENTRAL AVE., BALTIMORE 2, MD.

Just Off The Press (continued)

NITROGEN PULVERIZING. Describes firm's custom grinding services, utilizing liquid nitrogen process which makes possible fine pulverizing of heat-sensitive, oxidation-prone, or problem materials. 4p.—Liquid Nitrogen Processing Corp., Malvern, Pa. **(238)**

PEDESTAL SIFTER. Introduces newly designed compact unit with round bowl sifting compartment, free from corners or crevices, for easy cleaning. 2p.—Sprout, Waldron & Co., Muncy, Pa. **(239)**

PACKAGING

POLYETHYLENE EXTRUSION LAMINATIONS. Shows how molten polyethylene film "welds" itself to foil, paper, cellophane, and other materials to create strong heat sealable packages with odor free increased moisture protection. 10p.—Continental Can Co., NYC. **(241)**

POLYPROPYLENE. Details applications of special formulations for FDA approved material, boasting crystal clarity and toughness, combined with high resistance to grease, moisture, and many common chemicals. 12p.—Hercules Powder Co., Wilmington, Del. **(242)**

EXTRA STRENGTH FILM. Major features are sighted for new type film and its applications where extra strength is needed in food packaging. 4p.—American Viscose Corp., Philadelphia. **(243)**

BLISTER PACKAGER-SEALER. Gives complete details on unit's continuous motion operation which magazine feeds back-up cards, seals blister to card, and ejects finished package. 4p.—Wirth-Rhodes Corp., Chicago. **(254)**

POUCH FORMER, FILLER & SEALER. Introduces model that simultaneously forms, fills, and seals two bags, with maximum bag width of 2¾" and output of 200/min.—Ulbeco Inc., Paramus, N. J. **(244)**

WRAPPING MACHINE. Shows how you can save from 7%-10% of bread wrapping material costs with newly developed "Selectra-Standard" unit. 6p.—American Machine & Foundry Co., NYC. **(245)**

HIGH HUMIDITY BOARD. Provides case history of how this new packing material replaced wirebound wooden boxes for tomatoes and how it may be utilized in other applications. 2p.—The Mead Corp., Dayton, O. **(246)**

POUCH MAKER. Details how unit operates on continuous motion principle and is able to handle wide range of materials at speeds up to 300/min. 4p.—Delamere & Williams Co., Ltd., Toronto, Ontario. **(247)**

ACETATE-CARDBOARD PACKAGES. Describes firm's complete design and manufacturing facilities, including illustrations of unique styles, sizes, and shapes that have been produced.—SLM Plastics, Perth Amboy, N. J. **(248)**

HEAVY GAUGE POLYETHYLENE FILM. Introduces new material with crystal clarity and toughness, boasting good production speeds due to improved surface slip. 4p.—E. I. du Pont de Nemours & Co., Wilmington, Del. **(249)**

LABEL MAKERS. Outlines advantages and specs for complete line of simple, rugged machines that make brilliant, quality labels with sales messages that attract attention. 6p.—Sohn Mfg. Inc., Elkart Lake, Wis. **(250)**

PRESSURE SENSITIVE ADHESIVES. Handy guide outlines various types, properties, specs, and applications for easy selection of proper material for specific applications. 9p.—National Starch & Chemical Corp. **(251)**

SANITATION & MAINTENANCE

PENETRATING FLOOR SEALER. Outlines advantages of new low-cost, epoxy coating that protects concrete, wood, magnesite, cork tile, linoleum, and painted floors, while prolonging floor life. 4p.—The Hallemite Mfg. Co., Cleveland, O. **(255)**

RUST & SCALE REMOVER. Introduces newly developed dry powder product that's completely safe and equally effective in stainless steel cleaning. 2p.—Berman Chemical Co., Toledo, O. **(256)**

STEAM-DETERGENT CLEANING. Provides concise, up-to-date compilation of the most modern methods cur-

(Continued on page 126)

ONE OF A SERIES OF CHATS ABOUT THE CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

WHY THE BIG STRAIN?

It's tough to keep gases and liquids "clean" as they run through a pipe. They drag impurities along, which can make even plain water a trouble maker, let alone more sophisticated juices. That's because water, as a liquid or steam, is intimately involved with vital equipment like steam traps, temperature regulators, or tools. Meters, burners, nozzles, and pumps, too.

By this time you must realize we're going to talk strainers, don't you? A good, stout subject, of interest to all who feel production belongs up and costs belong down. Sarco makes strainers for water and condensate, steam, oil, air, gas and other piped fluids . . . dozens of different sizes and types and ratings of strainers to match every application need. Even our line of plain and simple strainers is built for super service. These are pipeline strainers, types AT, BT, and CT, which are designed for 250, 250 and 600 psi non shock, respectively, and 475°, 450° and 750°F. temperature ratings. Standard screens are heavy-gauge, perforated brass or stainless steel. Sarco specializes in screens that can withstand abnormal pressure differentials created by accumulated sediment.

Next, Sarco's flanged strainers, type D. These come in larger sizes, right up to 12", and are available in standard or extra heavy types.

And finally, *Sarco scraper strainers*, manual or motorized. These are the really eye-popping models, and if you can't use one yourself — well — you'll just have to get your kicks elsewhere.

Examples? Take Inland Steel Company at East Chicago, which gets water from Lake Michigan to cool its large air conditioner condensers. The water used to pass through traveling screens, but still contained fine sand. Clogging! Heat under collars! Frequent cleaning required! Sometimes practically no air conditioning on hot days. (Isn't that always the way?)

The Inland Steel people installed Sarco Rotary Scraper Strainers, Type VRS, which incorporate a hand-operated helical scraper knife within the cylindrical strainer screen. A few turns of the crank at regular intervals, and the sand is scraped off the screen, blown clear, and discharged at pressure through a manual valve to waste. Dismantle the strainer? Shut down the unit? Not *this* strainer!

Now, as long as we've come this far, it's only a hop and a skip to the Firestone Tire and Rubber Co. in Akron, Ohio, who also use water in tremendous quantities. They circulate it through tire presses and a cooling tower, and there's no nonsense about it. It *has* to be clean or damage to equipment could be downright catastrophic. When the plant

modernized and enlarged, Firestone replaced their 4" Sarco hand-operated scraper strainer, type VRS, with a larger Sarco 8" model. And while they were about it, they got the motor-operated type, for continuous cleaning.

When we say that companies like these want the insurance of a Sarco strainer, it sounds like advertisingese, but sometimes there just isn't any other way to put it. Sarco strainers *are* insurance at low cost on the operation of your high cost equipment. So when we ask if you have lumps in your pumps, or worries over your slurries, we're *serious*. We've heard everything in the straining line, so why not write us for literature and answers to those special problems you have.

A T-44 IS THE BEST POLICY

Sorry, but we can't leave the subject of insurance without bringing to your attention one of the best little insurance policies any company requiring cooling control could invest in. It's the *self-powered* Sarco T-44 Automatic Cooling Control. No compressed air or electricity is needed, but its advantages are best described in terms of three different plants of just one Sarco customer — Revere Copper and Brass, Inc.

Revere-Baltimore, Md., has cut water use 40 to 50% with T-44's. But in addition to former water waste, Revere had even more problems: possible wet air from uncontrolled cooling of compressor aftercoolers, plus sweating compressor cylinders; variations in viscosity of hydraulic oil and bearing oil; gas generator water waste; unreliability of manual shut-off of water supply when machines were down.

If your ears perk up in sympathy at mention of any of these problems, the results of Revere's cooling control program should bring you to full attention. One large compressor that had gulped 2400 gallons per hour now takes only 420 gallon sips. In addition all the problems itemized above were solved. T-44's are now used on their air compressors, gas generators, and hydraulic oil systems. At Revere-Riverside, Cal., water savings of 50% were experienced, and at Revere-Rome, N. Y., substantial savings were made too.

But after all, wasting water is only one way of wasting money, so let's go on to another matter of interest: the evils of manual control. When cooling water is controlled by hand the temptation to leave the valve nearly wide open is almost overpowering, in order to play it safe if the load varies. Result: overcooling, of course. And varying the flow runs the risk of undercooling. In either case, lowered process efficiency. Answer: The automatic Sarco T-44, which can't be tempted, is meticulously honest, unsentimental, and plain inhumanly practical when it comes to cooling control. You really ought to write for literature. T-44 is your best policy.

SPARE PARTS INSURANCE

As long as we're near the end, and still on this subject of insurance, may we graciously leave you with this valuable tip? No matter how closely a steam trap approaches perfection, some gremlin may cause it to act up. It's conceivable. So, keep on hand a parts list and spares of key parts for your steam traps and other system components. Parts are small and worth their weight in gold when you need them. A Sarco field engineer will make up a suggested list for you, if you tell us what components make up your system.

Might as well even keep a disc or two on hand for your Sarco Thermo-Dynamic Steam Traps, Type TD-50, even though they're so trouble-free our salesmen keep complaining about the lack of replacement parts business. We'll be glad to tell you about this unique steam trap in case you still don't know how miraculously simple and effective it is.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both — to the point where you'll communicate.

7819

SARCO COMPANY, INC., 635 MADISON AVE., NEW YORK 22, N.Y.

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

SARCO

CIRCLE 147 ON INQUIRY CARD FOR STRAINERS; 148 ON T-44; 125 ON TD-50

King Engineering Report

Air Defrost Increases Efficiency of Low Temperature Blast Freezing

The King Company's many years of experience have provided them with operating data on the various defrosting methods. King Co. engineers have found air defrost most advantageous. Some of the more important benefits are:

1. Freezing units are usually located outside of the cold room, saving valuable space, making service easy and comfortable.
2. Units may be defrosted in 20 to 30 minutes, once every two days to once every two weeks.
3. Defrosting operation requires minimum maintenance . . . no expensive defrosting agents are used . . . longer life for equipment is assured.
4. Full freezing capacity up to defrost time; longer periods between defrosting are results of higher capacity heat transfer engineered into King time-tested "wide-spaced" coil fins.

King engineers are always ready to advise operators of freezing or storage plants of the best procedure for any particular problem. This service is provided at no extra cost to users of King Sharp Freeze Systems.

50 years of experience is at your service

SHARP FREEZE SYSTEMS

King COMPANY OF OWATONNA

805 Cedar St. OWATONNA, MINNESOTA

Just Off The Press (continued)

rently used, including illustrations and specs for new steam-detergent gun and lightweight pistol. 4p.—Oakite Products Inc., NYC. **(257)**

DUST FILTER. Details, with diagrams, unit's design and construction including data for dimensions/specs and installation photos. 8p.—The Day Co., Minneapolis, Minn. **(258)**

EMPLOYEE HOUSEKEEPING CAMPAIGN. Gives guidance to food processors that are interested in an all-employee drive for better housekeeping on the job, including tips on how to organize and conduct the campaign. 10p.—Puritan Chemical Co., Atlanta, Ga. **(259)**

AIR POLLUTION CONTROL. Details new flooded bed scrubber for effective removal of difficult, obnoxious, and corrosive contaminants. 4p.—The John Wood Co., Bernardsville, N. J. **(260)**

DAIRY FLOOR CONSTRUCTION. Describes revolutionary concept consisting of metal floor plate secured to concrete sub-floor with unique new bonding cement. 7p.—Atlas Mineral Products Co., Mertztown, Pa. **(261)**

POURABLE SEALING COMPOUND. Describes and illustrates advantages and uses of new interior and exterior composition that permanently seals cracks and expansion joints. 2p.—The Monroe Co., Cleveland, O. **(262)**

MANAGEMENT

MANAGEMENT BOOKSHELF. Annual catalog of all books, periodicals, and films, produced by AMA, provides executives with reports on latest developments with practical solutions to management problems. 44p.—American Management Assn., NYC. **(301)**

PLANT LOCATION. Illustrates and describes the Scranton, Pa. area with photographs and charts showing its relationship to the world's richest markets. 22p.—Chamber of Commerce, Scranton, Pa. **(302)**

BUSINESS EDUCATION. Outlines highlights of recent study among businessmen, pertaining to type and degree of education necessary for successful business leadership. 4p.—Small Business Administration, Washington, D. C. **(303)**

TRADE REGULATIONS. Details both federal and state laws that regulate competitive business practices—showing what is prohibited and what is permissible under these laws. 4p.—Small Business Administration, Washington, D. C. **(304)**

SECURITY SERVICES. Provides a detailed review of the suprisingly many and varied professional security services that business and industry can outcontract to modern-day security agencies. 14p.—Pinkerton's National Detective Agency, NYC. **(305)**

MARKETING

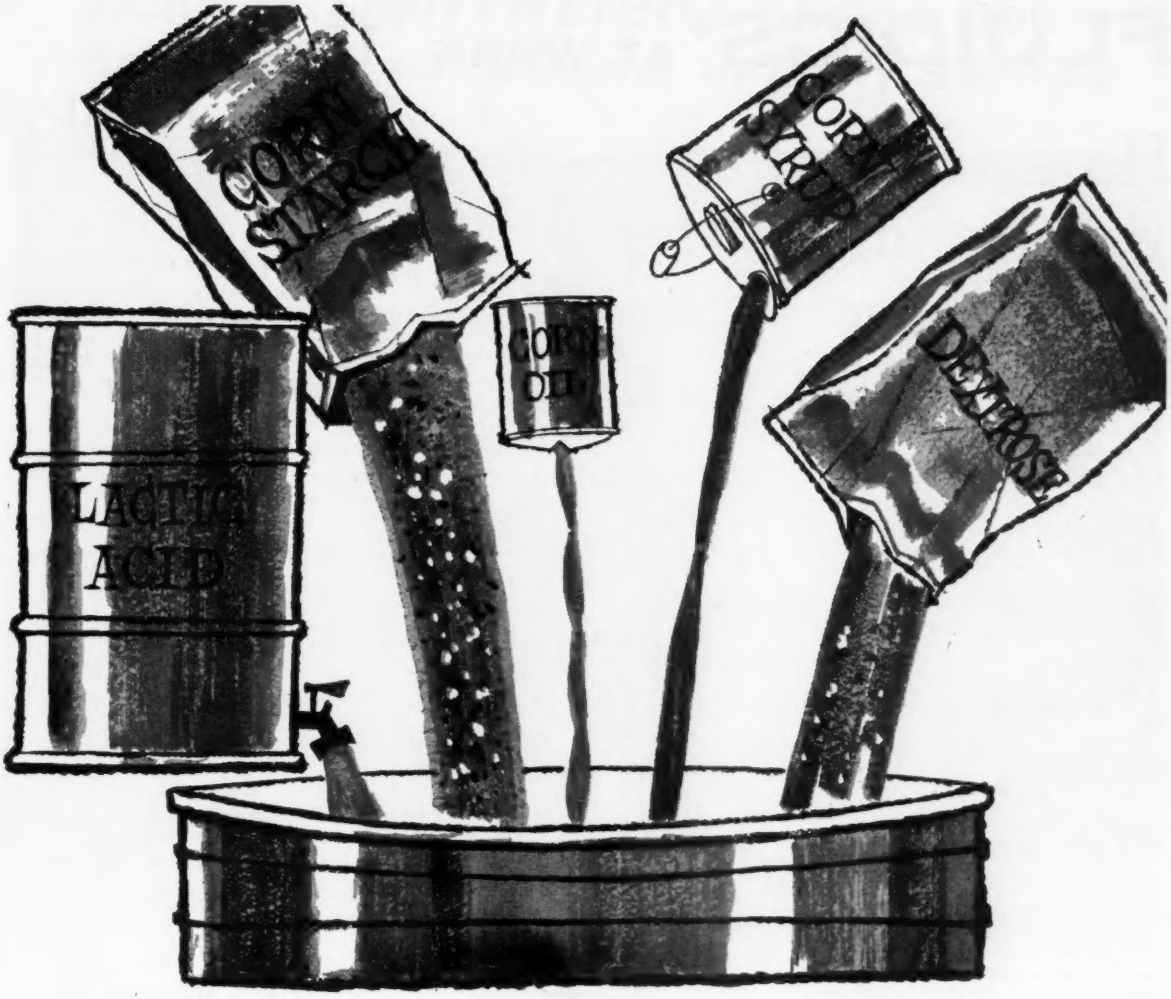
RADIO ADVERTISING. Provides largest collection of radio facts ever assembled—a concise compilation of data on the media's current status, including data on radio's growth as an information, entertainment, and advertising medium.—Radio Advertising Bureau, Inc., NYC. **(291)**

COMMERCIAL EGG MARKETING. Designed to help guide marketing agencies and the industry toward lower cost operations and maximum efficiency, this is the first in series of reports dealing with commercial egg marketing in Georgia as it existed during 1958-59. 42p.—Univ. of Georgia, Athens, Ga. **(292)**

MAJOR MARKETS ANALYSIS. Handy compilation of important data pertaining to 300 metropolitan areas shows ranking by food store sales, eating-drinking place sales, population, household, and per household retail sales. 90p.—Greensboro News & Record, Greensboro, N. C. **(293)**

FARM MARKET. Survey of more than 1,000 farm families in Minn., S.D., N.D., shows brand preferences and consumer usage of some food-beverage items. Also indicates trend from '59. 82p.—"The Farmer," St. Paul, Minn. **(294)**

INTERNATIONAL EXPANSION. Gives pointers on uses of international advertising for firms planning overseas marketing. Lists international magazines of American publishers with circulation and distribution areas.—Magazine Publishers Assn., NYC. **(295)**



When you use <u>our</u> products in <u>your</u> products, quality joins quality

The fine foods you process gain a new measure of sales appeal and consumer satisfaction when you use CLINTON products from corn. Over 50 years of corn processing experience assures the quality of CLINTON CORN SYRUP, CORN STARCH, REFINED CORN OIL, LACTIC ACID and CLINTOSE BRAND DEXTROSE.

Technical service always available

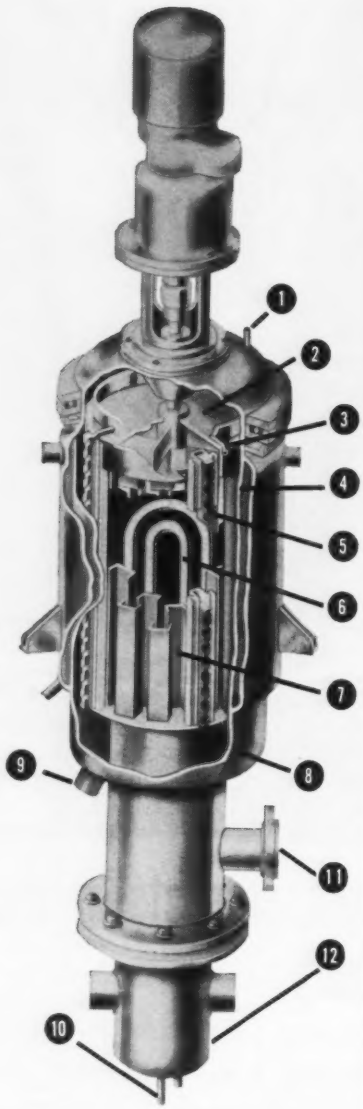
CLINTON CORN PROCESSING COMPANY

CLINTON, IOWA

CIRCLE 127 ON INQUIRY CARD

FLUIDICS* AT WORK

How a wiped film evaporator *concentrates tomato, honey, syrup, fruit juices and other foods*



This is the Pfaudler® Wiped Film Evaporator. It offers the food industry an efficient method for concentrating heat-sensitive or highly viscous materials in production quantities. With tomato, for example, you can concentrate up to 50% solids by weight.

HOW IT OPERATES: Product passes through feed inlet (1) onto the distributor plate (2) and then through four evenly spaced nozzles (3) onto the internal heated wall of the unit (4) just ahead of each wiper (5). The rotating wipers distribute the product in a thin uniform film over the evaporator wall, permitting efficient vaporization of the low-boiling constituents. Vaporized material passes through entrainment separators (7) and condenses on center "U" bundle (6). Distillate flows out drain (10) at bottom of unit. When vaporizing water only, internal condenser (6) and bonnet assembly (12) are omitted. Vapors then exhaust through nozzle (11) to an external condenser or directly to a steam ejector. The concentrate continues down the wall into collector (8) and flows out outlet (9). Entrained droplets flow down and off the separator channels into concentrate collector.

MORE INFORMATION: Bulletin 991 gives complete "specs" and operating characteristics. Ask for it. Or inquire about testing your product at our Test Center. Write to: Pfaudler Division, Dept. FE-91, Rochester 3, N. Y. In Canada, contact Pfaudler Permutit Canada Ltd., Toronto.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes

Useful New Books

Grocery Market Structure

CHANGES IN THE MARKET STRUCTURE OF GROCERY RETAILING *by Willard E. Mueller and Leon Garoian. The University of Wisconsin Press, 430 Sterling Court, Madison 6, Wis. 1961. 215p. Price: $6.00.*

This book is the only comprehensive analysis of changes in ownership patterns (including mergers), sales, means used to further growth of firms, market concentration, and vertical and horizontal integration in grocery retailing.

It is concerned primarily with measuring and explaining the changes that occurred in local, regional, and national market concentration from '40 to '58. Reasons for and extent of vertical integration by retailers into food manufacturing industries, and integration by food manufacturers into retailing field are analyzed and related statistically to the market structure of industries involved.

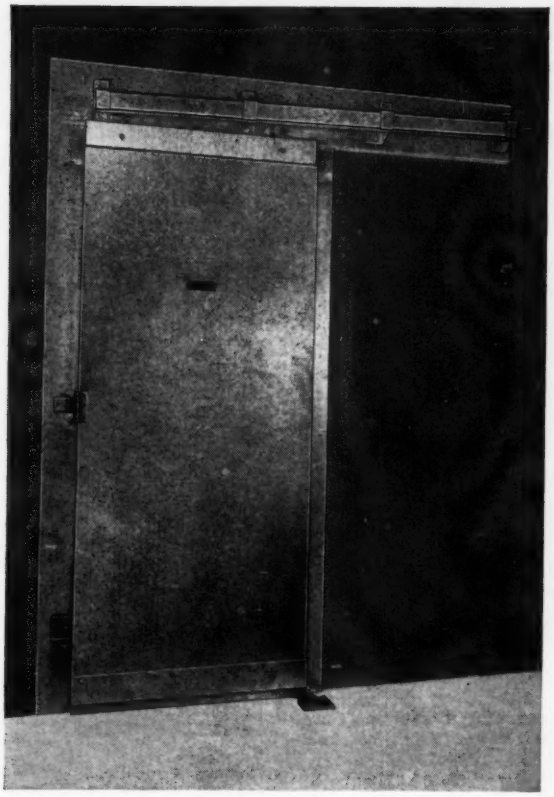
Booklets & Reports

TRANSLATED VOLUME OF USSR FOOD PROCESSING REPORTS. *Office of Technical Services, Business & Defense Services Admin., U. S. Dept. of Commerce, Washington, D. C.* Contains a collection of 18 articles on food processing compiled and published in a bound volume by the USSR food industry.

MICROSCOPIC-ANALYTICAL METHODS IN FOOD & DRUG CONTROL. *(FDA Technical Bulletin No. 1). U. S. Dept. of Health, Education & Welfare; FDA. 255p.* Bulletin succeeds in its entirety, FDA Circular No. 1, entitled "Microanalysis of Food & Drug Products," first published in '44 as a working guide to microanalytical methods.

EUROPEAN PACKAGING DIRECTORY. *The Tudor Press Ltd., 75 Carter Lane, London, E.C.4. 305p.* The most comprehensive guide to all aspects of packaging in Europe.

Jamison *LIGHTWEIGHT* Sliding Doors Solve Space Problems in Dairy Service

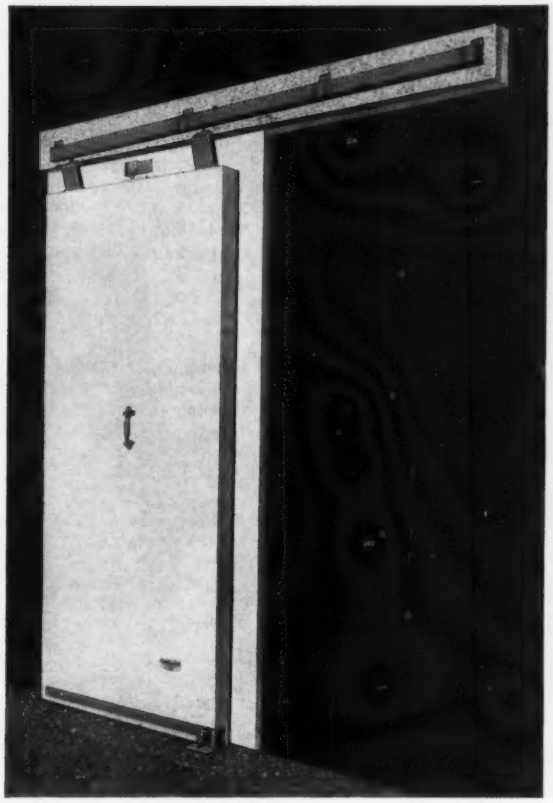


New Jamison Horizontal Sliding Door

This is an economical, serviceable door designed without frills or extras. It is easy to operate, it provides tight closure, it is lower in cost than many other doors.

Other Advantages:

available for cooler or freezer service
inclined track for self closing
#26 ga. galvanized steel cladding: front, edges, back
wedge-type, 3-point closure



Jamolite® Horizontal Sliding Door

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Fowl Defeathering Machine Comprising Housed Spraying and Picking Sections.—K. M. Roth, Modesto, Calif. No. 2,972,167.

Bladed Ram-Type Machine for Testing Tenderness of Food Products. — A. Kramer, L.E.E., Inc., Washington, D. C. No. 2,972,884.

Reducing Breakage of Dehydrated Potatoes by Treating Freshly Cut Small Pieces in Salt Solution to Leach Out Pectic Substances. — J. W. Cyr, Snow Flake Canning Co., Brunswick, Me. No. 2,973,-276.

Smoking Sausage Continuously by Moving Them Through Dense Smoking Zone Kept at 200-260F., Then Cooling 150F. Product to Packaging Temperature. —H. W. Barnett, Canada Packers, Ltd., Toronto, Canada, No. 2,973,277.

Frying Potato Chips in Hydrogenated Oil and Evenly Coating Cooked Chips With Uncooked Liquid Oil. — S. W. Arenson, Baltimore, Md. No. 2,976,153.

Making Frozen Confection by Forming Candy Shell Containing Enclosed Ice Cream Mix That's Frozen. — C. W. Heller, Vienna, Austria. No. 2,976,155.

Adding Antioxidant to Steam-Deodorized Oil to Improve Keeping Qualities. —A. Roylance, Lever Brothers Co., N. Y. C. No. 2,976,-156.

Foam-Drying Coffee Concentrate to Produce Readily Rehydratable Dried Product. — A. I. Morgan, Jr., USDA. No. 2,976,158.

Adding Water-Soluble Salts to Sour milk and Cream To Liquefy and Flocculate Casein Prior to Thermal Treatment Used in Making Butter.—A. Meyer, Hagen Chemicals & Controls, Inc. Pittsburgh, Pa. No. 2,977,-323.

Method of Freeze-Concentrating Fruit Juices by Continuously Separating Ice From Liquid Concentrate.—E. P. Wenzelberger, Union Carbide Corp., N. Y. C. No. 2,977,324.

EQUIPMENT

Apparatus for Testing Consistency of Flour-Water Mix. — S. J. Loska, Jr., Pillsbury Co., Minneapolis, Minn. No. 2,974,524.

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Spooning Device With Coring Knife for Drupe Fruit. —A. H. Kugler, California Packing Co., San Francisco. No. 2,975,811.

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Pear Peeling Machine. — M. E. C. Freeman, Food Machinery & Chemical Corp., San Jose, Calif. No. 2,975,813.

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Applying Caps to Bottles and Rolling Both Along Sealing Rail to Form Flange Under Bottle's Finish.—J. Avn, The West Co., Phoenixville, Pa. No. 2,974,455.

Apparatus for Sealing Layers of Sealing Bands of Cartons.—E. Walther, Regnitz Konstruktionsgesellschaft m.b. H., Forchheim, Upper Franconia, Germ. No. 2,974,460.

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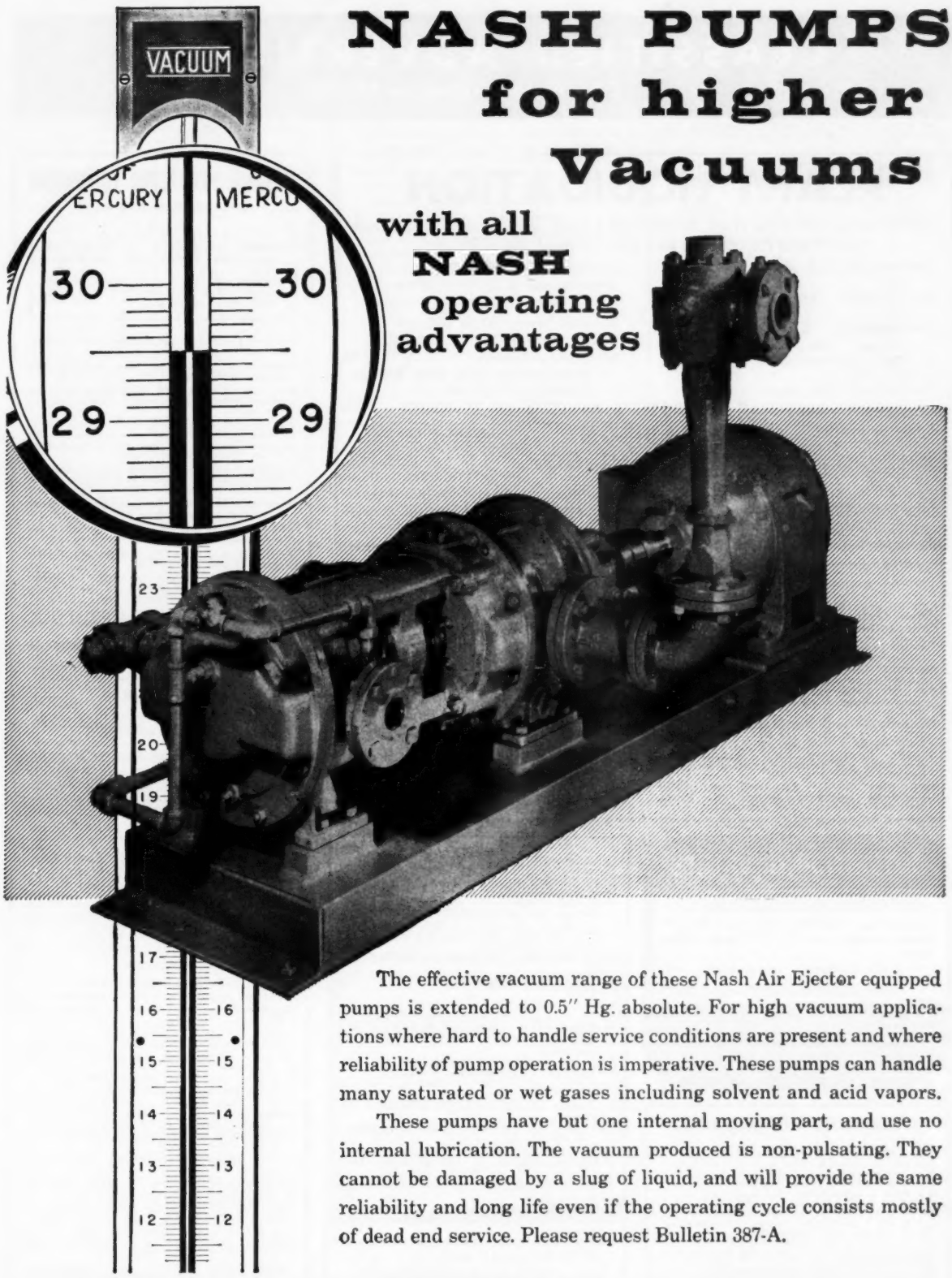

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BOX FE-95
c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39

PRODUCTION SUPERINTENDENT

Edible Fats and Oils refining and packaging, lard, shortening, etc. Must be experienced and capable of assuming full responsibility for production, quality control, personnel, cost reduction, product improvement, maintenance.

BOX FE-92
c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39

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SITUATION WANTED

AVAILABLE—Food Technologist. Broad and varied experience in technical, production and management phases of food processing. Relocate for top position. Box FE-94, c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39.

FLAVORING EXTRACT EXPERT specializing in manufacture of true fruit and artificial flavors seeks position. Location immaterial. Starting salary $50.00 per week. Box FE-96, c/o FOOD ENGINEERING, Chestnut at 56th, Phila. 39.

FOOD Engineering Chestnut & 56th Sts., Philadelphia 39, Pa.

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Name ..... Title .....

Company .....

Street .....

City ..... Zone ..... State .....

FOOD ENGINEERING

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Facts about equipment, ingredients, packages, supplies and services described or advertised in this issue are easily available to you through this section.

Numbers on back of each tear-out post card correspond to the key numbers on equipment, package, ingredient, sanitation, supply, or service items, and to advertisements.

It's easy. All you do is . . .

Select . . . items that interest you as you read this issue. All items are conveniently named in two lists on the following three pages. First list is alphabetically arranged by name of manufacturer or supplier. Second is alphabetical by product or service category.

Then . . .

Circle . . . number of each item you want on the back of one of the post cards.

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Advertisers' Alphabetical Listing

Circle corresponding numbers at left on Inquiry Card

28 **A-B-C Packaging Machine.** Case unloader & unscrambler, information.
34 **Air Reduction Sales Co.** Immersion freezing, information.
95 **American Bakers Assn.** Baking industry exposition.
18 **Anheuser-Busch.** Corn products.
123 **Automatic Transportation.** Automatic conveyor, specs, booklet.
92 **Buffalo Meter Co., Inc.** Electrivolume meter, information.
144 **F. L. Burt.** Piston filler, bul. 106.
72 **Cellucap.** Sanitary headwear.
58 **Centrico.** Clarifier.
5 **Chester-Jensen.** Plate heat exchangers.
127 **Clinton Corn Processing.** Corn products.
114 **Louis DeMarkus.** CO_2 & nitrogen mfg. systems, details.
32 **Distillation Products.** Nutritious lubricant, samples, information.
31 **Distribution Age.** Publication—physical distribution.
62 **Dodge Mfg.** Speed reducer, information.
107 **Dorr-Oliver.** Centrifuge, Bul. 2606.
16 **Dow Chemical.** Insulation, information.
84 **Dow Corning.** Silicone, data.
132 **Dow Corning.** Silicone defoamers, sample, data.
109 **E. I. DuPont deNemours.** Dry acid cleaner, booklet.
145 **Emhart Mfg.** Package packer, bul.
116 **Filter Paper.** Filter materials.
124 **Flavorex.** Black walnut flavor.
6 **Food Machinery & Chemical.** Continuous pressure cooker & cooler, information.
60 **Fostoria.** Infrared processing equipment, folder.
103 **Foxboro.** Centralized control system.
121 **Fritzsche Bros.** Flavors.
120 **Gas Atmospheres.** Gas generators, information.
20 **Geniseo.** Transistorized conveyor controls.
48 **B. F. Goodrich.** Pipe-pump connector.
143 **Gottscho.** Marker, literature.
99 **Hercules Powder.** Cellulose gum, details.
14 **Hoffmann-LaRoche.** Beta carotene, information.
36 **Illumitronic Systems.** Checkweighers, weight monitors, classifiers, information.
142 **International Flavors & Fragrances.** Flavors.
119 **J-E Plastics Mfg.** Plastic packages, Tech. data, samples.
129 **Jamison Cold Storage Door.** Horizontal sliding door, bulletin.
126 **King Co.** Blast freezing.
108 **Kohlenberger Engineering.** Compressors, condensers, cookers, literature.
35 **H. Kohnstamm.** Flavors, information.
118 **Klenzade Products.** Organic chorine cleaning powder.
96 **Ladish.** Valves.
98 **LaPorte Mat & Mfg.** Flexible steel conveyor belts, literature.
87 **Mack Trucks.** Trucks, leasing.
90 **Merck.** MSG.
76 **Miles Chemical.** Enzymes.
117 **Minneapolis-Honeywell Regulator.** Food processing instrumentation.
26 **Mixing Equipment.** Mixing equipment, bul. B-521.
61 **Monsanto Chemical.** Adipic acid, tech. booklet, sample.
10 **Morton Salt.** Flocron dispenser.
55 **National Starch & Chemical.** Stabilizer, information.
104 **Nestlé.** Proteins.
141 **Norda.** Flavors.
9 **Oakite Products.** Cleaning, information.
4 **Olin-Mathieson.** Cartons.
128 **Pfaudler Permutit.** Wiped film evaporator, specs.
11 **Repp Industries.** Freeze drying equipment, details.
111 **Rheem Mfg.** Centrifugally lined pails, samples, information.
27 **Riegel Paper.** Packages, information.
101 **Robbins & Myers.** Food pump.
148 **Sarco.** Cooling control, bul. T-44.
147 **Sarco.** Scraper strainers.
125 **Sarco.** Steam trap, bul. TD-50.
73 **Sellers Injector.** Cleaning equipment, catalog.
71 **Southwestern Supply & Machine Works.** Screw elevator, Engineering catalog.
130 **Spraying Systems.** Spray nozzles, catalog.
110 **Sprout-Waldron.** Conveying systems, pneumatic, information.
88 **Steelcote Mfg.** Epoxy finish, details.
115 **Stephens-Adamson Mfg.** Conveyor elevator system, bul. 358.
2 **Sterwin Chemicals.** Ingredient, information.
1 **Gebr. Stork.** Continuous sterilizer, facts.
75 **Sunkist Growers.** Lemon juice, information.
81 **Taylor Instrument.** Magnetic flowmeter transmitter, bul.
146 **Toledo Edison.** Plant locations, information.
64 **U. S. Steel.** Metal conveyor belts.
21 **U. S. Stoneware.** Tubing.
113 **Urschel Laboratories.** Cutting machine, information.
112 **Viking Pump.** Pump, information, catalog.
131 **Wheeling Stamping.** Bottle tops.
89 **Yarnall-Waring.** Steam traps, information, bul.

Product or Service Category Listing

Cleaning & Sanitation Equipment & Materials

260 **Air pollution control.** John Wood.
349 **Black light units.**
354 **Bottle-washing compounds.**
351 **Chlorinated detergents.**
337 **Circulating parts washers.**
9 **Cleaning.** Oakite Products.
73 **Cleaning equipment.** Sellers Injector.
109 **Dry acid cleaner.** E. I. DuPont.
411 **Dust collector.** Torit Mfg.
258 **Dust filter.** Day.
346 **Electronic dust control.**
259 **Employee housekeeping campaign.** Puritan Chemical.
352 **Floor cleaners.**
265 **Floor wax & wax remover.** DuBois Chemicals.
345 **Heavy duty vacuum cleaners.**
336 **In-place cleaning systems.**
347 **Insecticide foggers.**
355 **New cake-form insecticide.**
118 **Organic chlorine cleaning powder.** Klenzade Products.
350 **Pest-bird control methods.**
342 **Rider-type power sweepers.**
256 **Rust & scale remover.** Berman Chemical.
353 **Sanitizers.**
343 **Self-propelled floor scrubbers.**

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Company .....

Address .....

City ..... Zone ..... State .....

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Where ads offer more than one item, I've written key number and identity below

.....

SEPTEMBER 1961
Expires Nov. 30, 1961

IMPORTANT MUST INFORMATION
Please check in A & B below best description

A—Your Function

☐ 1. Corp. or Admin. Mgmt.
☐ 2. Plant Operat. Mgmt.
☐ 3. Tech. or Eng. Mgmt.
☐ 4. Other

B—Principal Product

☐ 1. Baked Goods
☐ 2. Beverages
☐ 3. Confectionery
☐ 4. Fruits & Vegetables
☐ 5. Grain Products
☐ 6. Meat, Poultry, Fish
☐ 7. Milk & Milk Products
☐ 8. Sugar & Sugar Products
☐ 9. All Other Foods

←CHECK *Important Must Information*

WRITE—*name, title, company and address*

CIRCLE—*number of items you want*

MAIL

339 **Spray cleaning assemblies.**
341 **Steam cleaners.**
257 **Steam-detergent cleaning.** Oakite Products.
340 **Tank-truck spray units.**
338 **Ultrasonic cleaning devices.**
348 **Ultrasonic rodent control.**
344 **Waste disposal units.**

Coating Equipment

237 **Confectionery equipment.** Jabez Burns & Sons.

Disintegration Equipment

422 **Air-attrition mill.** Bauer Bros.
236 **Cluster cutter.** Chisholm-Ryder.
113 **Cutting machine.** Urschel Laboratories.
228 **Dry processing equipment.** Sturtevant Mill.
238 **Nitrogen pulverizing.** Liquid Nitrogen Processing.

Dry Separation Equipment

116 **Filter materials.** Filter Paper.
227 **Magnetic separator.** Dings Magnetic Separator.
239 **Pedestal sifter.** Sprout Waldron.
401 **Polypropylene filter cloth.** Technical Fabricators.
147 **Scraper strainers. Sarco.**

Electrical Equipment

214 **Gasoline electric set.** Allis-Chalmers.
409 **Sanitary motor.** Rueland Electric.
217 **Shell-type motors.** Louis Allis.

Truck Leasing

87 **Trucks, leasing.** Mack Trucks.

Heat Processing Equipment

108 **Compressors, condensers, cookers.** Kohlenberger Engineering.
6 **Continuous pressure cooker & cooler.** Food Machinery & Chemical.
60 **Infrared processing equipment.** Fostoria.
233 **Process equipment buyer's guide.** Pfaudler Permutit.
1 **Sterilizer, continuous.** Gebr. Stork.
425 **Sterilizer, pilot agitating.** Berlin Chapman.

Heat Transfer Equipment

208 **Heat exchangers.** Patterson-Kelley.
5 **Heat exchangers, plate.** Chester-Jensen.

Ingredients & Additives

61 **Adipic acid.** Monsanto Chemical.
14 **Beta carotene.** Hoffmann-LaRoche.
124 **Black walnut flavor.** Flavorex.
99 **Cellulose gum.** Hercules Powder.
18 **Corn products.** Anheuser-Busch.
127 **Corn products.** Clinton Corn Processing.
76 **Enzymes.** Miles Chemical.
277 **Fermentation nutrients.** Amber Laboratories.
276 **Flavoring services.** International Flavors & Fragrances.
121 **Flavors.** Fritzsche Bros.
142 **Flavors.** International Flavors & Fragrances.
35 **Flavors.** H. Kohnstamm.
141 **Flavors.** Norda.
10 **Flocron dispenser.** Morton Salt.
2 **Ingredient.** Sterwin Chemicals.
75 **Lemon juice.** Sunkist Growers.
90 **MSG.** Merck.
32 **Nutritious lubricant.** Distillation Products.
467 **Pepsin.** Dairyland Food Laboratories.
104 **Proteins.** Nestlé.
203 **Rennet production.** Fibetron Corp.
84 **Silicone.** Dow Corning.
266 **Silicone antifoams.** Hodag Chemical.
132 **Silicone defoamers.** Dow Corning.
55 **Stabilizer.** National Starch & Chemical.
466 **Sweeteners.** Penick & Ford.

Lubrication

221 **Corrosion resistant lubrication.** Electrofilm.

Management Services

95 **Baking industry exposition.** American Bakers Assn.
303 **Business education.** Small Business Administration.
292 **Commercial egg marketing.** University of Georgia.
294 **Farm market. The Farmer.**
295 **International expansion.** Magazine Publishers Assn.
301 **Management bookshelf.** American Management Assn.
304 **Trade regulations.** Small Business Administration.

Construction & Fabrication

261 **Dairy floor construction.** Atlas Mineral Products.
88 **Epoxy finish.** Steelcote Mfg.
16 **Insulation.** Dow Chemical.
263 **Nickel alloy coating.** General American Transportation.
255 **Penetrating floor sealer.** Hallemite Mfg.
264 **Plastic lining material.** Joseph T. Ryerson & Son.
262 **Pourable sealing compound.** Monroe.
218 **Silicone rubber products.** Hewitt-Robins.

Materials Handling Equipment

270 **Bucket elevators.** Springfield welding.
404 **Caster wheels.** Rapids-Standard.
273 **Complete equipment line.** Clark Equipment Co.
110 **Conveying systems, pneumatic.** Sprout Waldron.
123 **Conveyor, automatic.** Automatic Transportation.
408 **Conveyor belt.** General Plastics.
98 **Conveyor belts, flexible steel.** La Porte Mat & Mfg.
64 **Conveyor belts, metal.** U. S. Steel.
419 **Conveyor control system.** Genisco.
115 **Conveyor elevator system.** Stephens-Adamson Mfg.
268 **Conveyors, steel belt.** Sandvik Steel.
240 **Feeder automation accessories.** Automatic Feeder.
267 **Fork truck, sitdrive.** Lewis-Shepard Products.
271 **Reduce meat handling costs.** Rapids-Standard.
269 **Rotary bulk feeders.** Beaumont Birch.
266 **Pneumatic conveyor selection.** Fuller.
71 **Screw elevator.** Southwestern Supply & Machine.

Measurement & Control Instruments

284 **Analytical instruments.** Phillips Electronic Instruments.
103 **Centralized control system.** Foxboro.
252 **Checkweigher, case & bag.** Exact Weight Scale.
36 **Checkweighers, weight monitors, classifiers.** Illumitronic Systems.
279 **Checkweighers, in-line.** Toledo Scale.
92 **Electrivolume meter.** Buffalo Meter.
234 **Flow responsive equipment.** B-I-F Industries.
117 **Food processing instrumentation.** Minneapolis-Honeywell Regulator.
278 **Gas chromatograph.** Beckman Instruments.
407 **Humidity control.** Bahnson.
281 **Liquid density gauges.** Nuclear Chicago.

SEPTEMBER 1961
Expires Nov. 30, 1961

CHECK→ ***Important Must Information***

IMPORTANT MUST INFORMATION

Please check in A & B below best description

WRITE—*name, title, company and address*

A—Your Function

- ☐ 1. Corp. or Admin. Mgmt.
- ☐ 2. Plant Operat. Mgmt.
- ☐ 3. Tech. or Eng. Mgmt.
- ☐ 4. Other

CIRCLE—*number of items you want*

B—Principal Product

- ☐ 1. Baked Goods
- ☐ 2. Beverages
- ☐ 3. Confectionery
- ☐ 4. Fruits & Vegetables
- ☐ 5. Grain Products
- ☐ 6. Meat, Poultry, Fish
- ☐ 7. Milk & Milk Products
- ☐ 8. Sugar & Sugar Products
- ☐ 9. All Other Foods

MAIL

Name .....**Title** .....

Company .....

Address .....

City .....**Zone** .....**State** .....

Do you wish to receive FOOD Engineering? YES ☐ NO ☐

Please send me further information on the items circled below—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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Where ads offer more than one item, I've written key number and identity below

.....

81 **Magnetic flowmeter transmitter.** Taylor Instrument.
282 **Pressure-vacuum controls.** United Electric Controls.
420 **Refractometer.** American Optical.
283 **Refractometer, in-line.** Waters Associates.
423 **Soxhlet extractor.** Glas-Col Apparatus.
280 **Switches, precision.** Micro Switch.
20 **Transistorized conveyor controls.** Genisco.
402 **Weighing system.** Toledo Scale.

Mechanical Power Transmission

222 **Couplings, flexible cushion.** Dodge Mfg.
225 **Couplings, steelflex.** Falk Corp.
212 **Drives, dry fluid.** Dodge Mfg.
220 **Screw jacks, worm gear.** Joyce-Cridland.
62 **Speed reducer.** Dodge Mfg.

Mixing Equipment

405 **Homogenizer, sonic.** Sonic Engineering.
231 **Horizontal mixers.** Young Machinery.
26 **Mixing equipment.** Mixing Equipment.
230 **Portable mixers.** Cleveland Mixer.

Moisture Removal Equipment

424 **Conical spray dryer.** Bowen Engineering.
11 **Freeze drying equipment.** Repp Industries.
128 **Wiped film evaporator.** Pfaudler Permutit.

Packaging Equipment

426 **Automatic bagger.** Richardson Scale.
254 **Blister packager-sealer.** Wirth-Rhodes.
406 **Case gluer.** Emhart Mfg.
253 **Case packer.** Miller Hydro.
28 **Case unloader & unscrambler.** A-B-C Packaging Machine.
427 **Heat sealer.** Packaging Industries.
418 **Imprinting labeler.** Monarch Marking System.
250 **Label makers.** Sohn Mfg.
143 **Marker.** Gottscho.
145 **Package packer.** Emhart Mfg.
144 **Piston filler.** F. L. Burt.
244 **Pouch former, filler & sealer.** Ulbeco.
247 **Pouch maker.** Delamere & Williams.
410 **Sealer, gluer, set-up.** A-B-C Packaging Machine.
205 **Stapling sausage rings.** Bostitch.
403 **Wrap-around packager.** Continental Can.
245 **Wrapping machine.** American Machine & Foundry.

Packaging Materials

248 **Acetate-cardboard packages. SLM Plastics.**
131 **Bottle tops.** Wheeling Stamping.
316 **Carton, compartmented.** Packaging Corp. of America.
4 **Cartons.** Olin Mathieson.
311 **Easy-open ham can.** American Can.
243 **Extra strength film.** American Viscose.
412 **Fast opening bag.** St. Regis Paper.
246 **High humidity board.** Mead.
249 **Heavy gauge polyethylene film.** E. I. DuPont.
315 **Individual serving packets.** Miliprint.
219 **Lattic braid packings.** Garlock.
206 **Multi-wall bag.** Bemis Bros. Bag.
314 **Package design for frozen potato packages.** KVP Sutherland Paper.
27 **Packages.** Riegel Paper.
312 **Pictorial metal lids.** Continental Can.
119 **Plastic packages. J-E Plastics Mfg.**
241 **Polyethylene extrusion laminations.** Continental Can.
242 **Polypropylene.** Hercules Powder.
251 **Pressure sensitive adhesives.** National Starch & Chemical.
318 **Specialty flavor stock designs for ice cream.** Reigel Paper.
317 **Tamper proof seal for aerosol cans.** Pharmaplastics.

Pipes, Valves, Tubing, Spray Nozzles

213 **Pipe connectors, flexible.** Allied Metal Hose.
48 **Pipe-pump connector.** B. F. Goodrich.
130 **Spray nozzles.** Spraying Systems.
125 **Steam trap.** Sarco.
89 **Steam traps.** Yarnall-Waring.
21 **Tubing.** U. S. Stoneware.
413 **Valve.** Alloy Steel Products
96 **Valves.** Ladish.

Air Conditioning & Refrigeration

148 **Cooling control.** Sarco.
215 **Jet blowers & blast nozzles.** Schutte & Koerting.
129 **Horizontal sliding door.** Jamison Cold Storage Door.
235 **Quick opening door.** Biggs United.
421 **Refrigeration-heating system.** Worthington.
416 **Sliding cooler door.** Jamison Cold Storage Door.

Plant Security

305 **Security services.** Pinkerton's National Detective Agcy.

Plant Services

114 **CO^2 and nitrogen mfg. systems.** Louis DeMarkus.
414 **Mailing machine.** Pitney-Bowes.
201 **Radio paging system.** Motorola.
72 **Sanitary headwear.** Cellucap Mfg.
207 **Stainless steel tank liner.** U. S. Steel.

Plant Site

302 **Plant location.** Scranton C. of C.
146 **Plant locations.** Toledo Edison.

Product Freezing Equipment

126 **Blast freezing.** King of Owatonna.
229 **Chiller units.** Recold.
34 **Immersion freezing.** Air Reduction Sales.
274 **Truck refrigeration units.** Thermo King.

Pumps & Air Compressors

211 **Centrifugal pumps.** Goulds Pumps.
224 **Centrifugal pumps.** Goulds Pumps.
415 **Dispensing pump.** Multi-Meter.
101 **Food pump.** Robbins & Myers.
223 **Leakproof pumps.** Fostoria.
112 **Pump.** Viking Pump.
216 **Stationery air compressors.** Westinghouse Air Brake.

Shipping Containers

111 **Centrifugally lined pails.** Rheem Mfg.
313 **Piggy-back container.** Stone Container.
417 **Plastic Tank.** American Agile.

Power Generating Equipment

120 **Gas generators.** Gas Atmospheres.

TV, Radio, & Print

31 **Distribution Age.**
293 **Major market analysis.** Greensboro News & Record.
291 **Radio Advertising.** Radio Advertising Bureau.

Wet Separation Equipment

107 **Centrifuge.** Dorr-Oliver.
58 **Clarifier.** Centrico.
232 **Electrodialysis.** Aqua-Chem.

CIRCLE KEY NUMBERS ON OTHER SIDE OF CARD. WRITE NAME, ADDRESS—AND MAIL!

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Exclusive Basic Materials for: Candy and Chewing Gum, Dairy Products (Ice Cream and Cheese), Soft Drinks, Desserts (Puddings and Gelatins), Meat Products, Syrups, Bakery Products (Cake Mixes, Crackers, Snack Items), Pharmaceutical Products, Liquors and Cordials.

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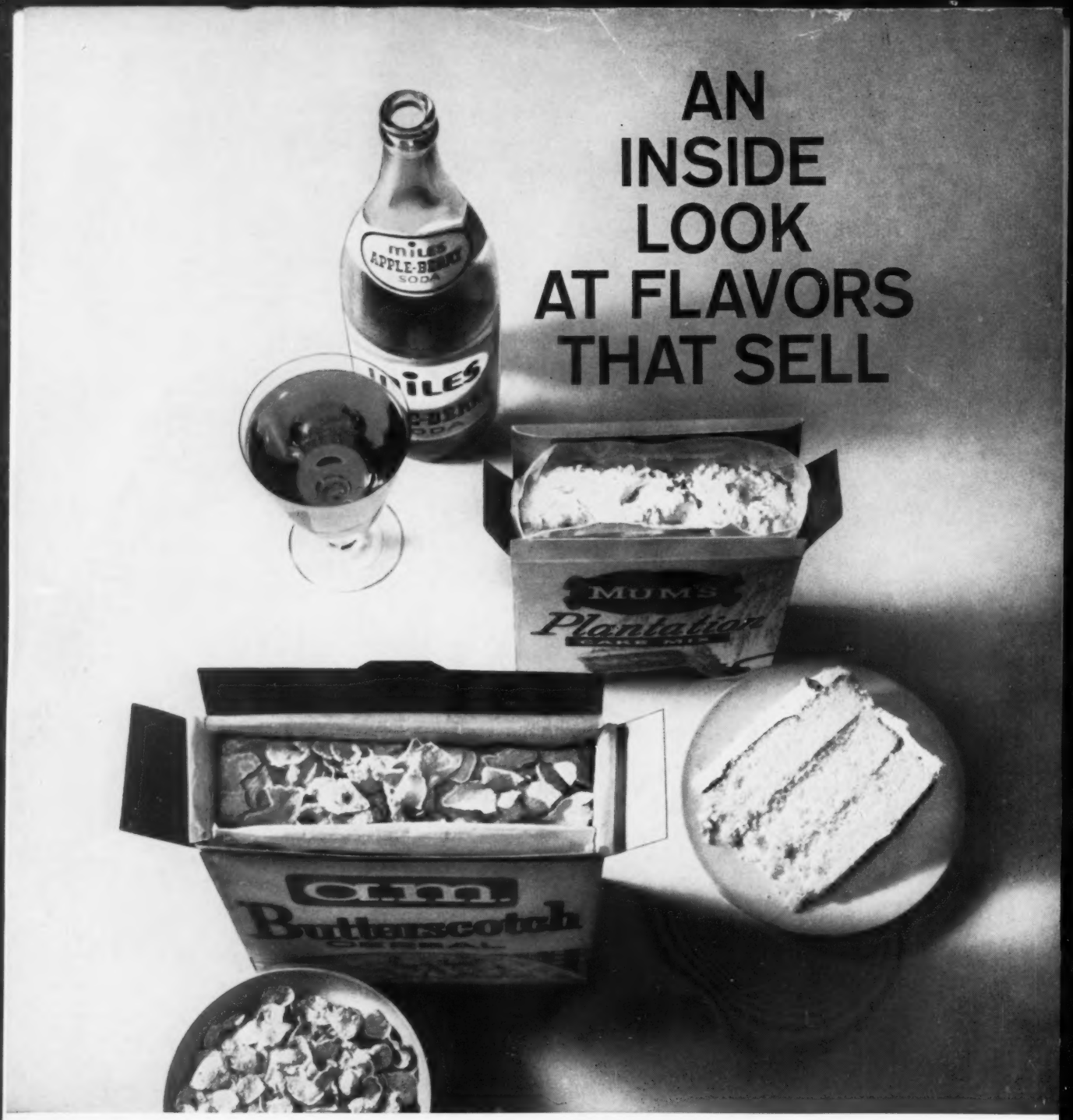

Look closely at any successful flavored product. Taste it, compare it. Why is it some flavors have compelling consumer appeal?

IFF flavors sell and resell for two important reasons. They are exclusively designed for your product, your markets—and they are the finest flavors available. IFF flavors have created new product lines, improved established ones and stimulated brand-building sales the world over.

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